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A Series of Cases
OF
CEREBRAL EMBOLISM CONSEQUENT ON THE RECEPTION OF GUNSHOT INJURY TO THE CAROTID ARTERIES.

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THE occurrence of thrombosis in the great arteries of the limbs in consequence of gunshot injury to the vessels, short of actual perforating lesions, is comparatively frequent. These injuries not uncommonly progress favourably, and although arterial thrombosis is as a rule followed by an identical subsequent lowering of the general nutrition of the limb to that seen after obliteration of the lumen of a great vessel by ligature, yet a useful limb is the common permanent result. Experience, moreover, has abundantly proved that the deposition of arterial thrombi may be entirely independent of septic infection, and that emboli as free from infection as those arising from the detachment of clot from the interior of an aneurysmal sac are not infrequent. When a thrombosed vessel lies exposed in an infected wound the consequences may be less favourable, as the thrombus is then apt to disintegrate, and either septic emboli may be set free or secondary hæmorrhage may occur when the weakened damaged arterial wall becomes exposed to the full force of the blood pressure.

The group of cases which forms the subject matter of this paper consists of a series of injuries to the great vessels of the neck. They illustrate the whole subject and offer special interest from the fact that embolic obstruction of even minor cerebral vessels may produce more serious effects and is more readily recognised than the blocking of vessels supplying small areas of the limb where arterial anastomosis is freer and where degeneration of the tissues concerned is less important in its effects.

Signs of cerebral disturbance, apart from those of simple cerebral anæmia, secondary to injuries to the great vessels of the neck, either due to accidental wounds or the result of operative procedure, are occasionally met with in civil practice, and difficulty has arisen in explaining them. The opportunity afforded by military practice for observation of numerous cervical wounds of a contused character has shown this complication to be more common than has been previously recognised, and has afforded occasion for the elucidation of its nature.

The cases shortly dealt with below are of considerable practical interest both from the unfavourable prognostic course observed and also the complicated nature of the symptoms liable to be met with. The present communication is founded on the clinical history of 14 cases, and I must at once express my gratitude and indebtedness to my colleague, Lieutenant-Colonel Gordon Holmes, for his kindness in examining at my request the larger number of the patients and furnishing me with authoritative neurological details of their condition.

Nature of the Injury to the Vessels.

Although chief interest lies in instances in which embolism follows a non-perforating lesion of the vessels, yet it has seemed advisable to include in this communication certain cases in which a perforating injury was known to exist, because the symptoms and clinical history are identical in either class, and in the latter no reasonable doubt can be entertained as to the origin of the embolus and its causal importance in the production of the cerebral symptoms.

The presence of a definite perforating wound of the artery has been assumed from the existence of obvious signs. Thus, a systolic arterial bruit, an arterio-venous murmur and purring thrill, the detection of a pulsating swelling in the course of the vessel, or the occurrence of secondary hæmorrhage demanding surgical intervention. In one instance also the locality of the injury and the probability of an obliterated opening was indicated by a small circumscribed induration in the course of the vessel.

A non-penetrating injury has been assumed when none of the above signs could be detected, while diminution or abolition of the carotid or superficial temporal pulses has been regarded as evidence of obstruction or complete obliteration of the arterial lumen.

It may be observed in relation to the latter signs that obliteration or considerable diminution of the distal pulse, although a corroborative factor, is by no means a necessary sign for the diagnosis of the formation of an arterial thrombus. As I have already pointed out in a previous communication on the vascular injuries due to gunshot wounds,[1] a lateral lesion consisting essentially in a rupture of the intima may be followed by the formation of a lateral mural thrombus deposited at the injured area. Such thrombi projecting into the lumen of the vessel may gradually grow and completely obstruct the vessel or may become detached and give origin to an embolus. A limited lesion is indeed probably a more serious source of danger than a more extensive damage leading to the rapid formation of a completely occluding thrombus, since the latter possesses a firmer attachment to the whole circumference of the vessel, and consequently greater ability to resist the detaching force of the arterial blood pressure. It may further be noted that the blood pressure in such cases is often a rising one as the shock of the injury is passing off.

Limited injuries are, in fact, the most prolific source of origin of the class of case to which this article is mainly devoted. The probability of an arterial lesion may also be strengthened by observation of the course of the wound track where both apertures of entry and exit are present, or by localisation of a retained missile by examination with the X rays. In other cases the co-existence of signs of injury to closely contiguous structures may be of aid in making a diagnosis. In this last particular signs of injury to the cervical sympathetic chain take a prominent place. These signs were present in 5 out of the 14 cases dealt with, and in each instance the missile had probably passed behind the vessels, a course favourable to the escape of the artery with a contusion only, since it might be lifted and would not be exposed to the danger of being caught between the missile and the resistant vertebral column.

Clinical History.

Before passing to a short account of the illustrative cases some general remarks on the clinical course may be premised.

One matter of primary importance, determination of the period which elapsed between reception of the injury and the onset of signs of the cerebral lesion, has proved of considerable difficulty from a variety of reasons. The patient has often been rendered more or less unconscious at the moment of the accident, and he may remain in this condition even at the time of admission to a general hospital. He is often aphasic or may have received concurrent injuries which have obscured the onset of paralytic symptoms. Lastly, the origin of the symptoms has not, as far as I know, been recognised by the medical officers serving in the front lines, and even if this has been the case a continuous record from the various officers under whose charge the patient may have come during the process of transference to the base is rarely to be obtained.

The actual rapidity with which a clot may be formed and provide a thrombus which would furnish an embolus capable of producing more or less extensive obstruction in the cerebral circulation is naturally mainly a matter of surmise. Reasoning, however, from analogy, the rapidity with which a clot capable of causing cessation of hæmorrhage from a ruptured or divided artery in the limbs allows us to conclude with some confidence that a period of a few minutes would suffice. Hence very early development of symptoms need not be any occasion for surprise.

Of the instances recorded in the table in which definite information could be elicited, in one (Case 12) the symptoms were said to be immediate; in a second (Case 9) power was lost one hour after reception of the wound; in a third (Case 4) the patient did not lose consciousness, and walked a mile after being struck, becoming aphasic and deprived of power in his right arm at the end of 12 hours; in a fourth (Case 10) paralysis came on 24 hours after the left common carotid artery had been occluded by ligature;

[1] Brit. Journ. of Surg., vol. iii., No. 11, 1916, p. 356.

in a fifth and sixth (Cases 5 and 11) the paralysis supervened three days after the injury to the neck; and in a seventh (Case 13) the embolus was detached from an aneurysmal sac four days after the right common carotid artery had been occluded by a proximal ligature. The remainder of the patients were either unconscious or completely aphasic at the time of admission to the hospital and no information could be gained from them.

A remark has already been made regarding the importance of the position and direction of the wound track, and the corroborative evidence of its contiguity to the vessels offered by the existence of signs resulting from damage to the cervical sympathetic nerves. These latter, narrowing of the pupil, sinking of the eyeball, together with narrowing of the palpebral fissure, and interference with the function of the sweat glands, were a prominent feature in no less than 5 of the 14 cases under consideration.

In Case 2 an area of induration in the course of the vessel indicated the locality of the damage; in Cases 7, 8, and 14 the presence of a systolic bruit definitely determined the existence of a perforating wound of the arterial wall; while in Cases 8 and 13 an aneurysmal sac, in one instance Case 1, of an arterio-venous nature, was obvious.

Examination of the distal circulation for evidence of arterial obstruction revealed no palpable change in 6 cases (Cases 1, 5, 6, 7, 10, and 11), diminution in strength of the temporal pulse in 2 (Cases 2 and 4), complete abolition of the temporal pulse in 5 (Cases 3, 8, 9, 12, and 14), and absence of pulsation in the external carotid in 1 (Case 3).

The nature and extent of the cerebral symptoms are best followed by reference to the notes below, for which I am indebted to the kind aid of Lieutenant-Colonel Gordon Holmes, but a word may be added as to the diagnostic difficulty which may arise in the interpretation of these cases. This difficulty, as in all gunshot wounds of war, depends either on a multiplicity in the injuries received, or on the fact that the same track may involve a series of elements of the nervous system—e.g., brain, spinal cord, peripheral nerves, or the sympathetic system. Thus in this series, in one instance a scalp wound on the paralysed side of the body appeared to be accompanied by a contre-coup surface injury to the brain, giving rise to rigidity of the opposite arm (Case 5); in another (Case 7) the patient had been trephined with negative result in consequence of the existence of a scalp wound which gave rise to the suspicion of a fracture of the skull with depression of fragments of the internal table; and in a third (Case 6) a brachial monoplegia of cerebral origin was complicated by paraplegia dependent on an injury to the spinal cord accompanying a fracture of the posterior arches of the dorsal vertebræ produced by the same bullet, which had entered by the neck. In Case 12 a peripheral facial palsy was present on the same side of the injury, and direct injury to the temporal artery had obliterated its normal pulsation.

Brief details of the whole number of cases are set out in the table, but in order to afford a better account of the condition of the nervous system the following concise histories of five of the patients are added.

CASE 4. *Non-penetrating lesion of the left common carotid artery.*—The patient was admitted into No. 1 Canadian General Hospital under the care of Lieutenant-Colonel Finley on Dec. 12th, 1915, having probably been wounded a day or two earlier. He thinks the bullet entered by his mouth, and this statement is supported by the presence of scarring of the lip and fractures of the left premolar and incisor teeth. The wound of exit is situated 2 inches to the left of the fifth and sixth cervical spinous processes. Consciousness was not lost at the time of the accident, and the man walked a mile to a first-aid post with full power over his limbs. Twelve hours later, during the night, he suddenly lost power in the right upper and lower extremities, and his speech became affected. No fit occurred.

When admitted to hospital there was complete flaccid palsy of the right upper extremity, the left lower extremity could only be moved slightly, and aphasia was complete. During the succeeding fortnight some improvement took place, and the condition on Dec. 21st was as follows:—

"The wound of exit is healed; there is slight fullness over the left carotid artery, but no abnormal pulsation, thrill, or murmur. Pulsation in the temporal vessels is equal. There is some difficulty of speech, but the patient answers questions rationally. Pupils, both circular and react to light, but the left is much smaller and ? no dilatation to shade and no skin sympathetic reflex. The left eye is sunken and the palpebral fissure narrowed. Both sides of the face are equally dry. There is considerable weakness of the right facial muscles, and the tongue is protruded to the right. Motor system:—Upper extremity somewhat wasted, especially distally; all movements are possible but much weaker than on the left side, distally proportionately more so. Slight rigidity of shoulder and elbow. No ataxia. Lower extremity, all movements possible but weaker than left. No rigidity. Reflexes:—Arm-jerks: R. ++; L. normal. Knee-jerks: R. ++; L. normal. Ankle-jerks: R. ++; L. normal. Right ankle-clonus. Abdominal reflex: R. −; L. +. Plantar reflex: R. extensor; L. flexor. Sensation:—Touch unaffected. Pain unaffected. Position: R. diminished. Form lost. Diagnosis: Cortical embolism."

CASE 5. *Non-penetrating injury of the right common carotid artery.*—The patient was admitted into No. 1 Canadian General Hospital under the care of Lieutenant-Colonel Finley. He had been wounded probably on Dec. 18th. A superficial glancing wound of the scalp was present in the left occipital region with no apparent injury to the bone (X rays), also a small irregular wound at the middle of the posterior border of the right sterno-mastoid muscle. Temporal pulses equal. Nothing abnormal palpable in course of carotid. Three days after infliction of the injuries left hemiplegia suddenly occurred. No fit. On Dec. 20th the man became incontinent and the left limbs spastic; also some rigidity of the right arm was noted. On Jan. 21st, 1916, the condition was as follows:—

"The patient is dull and stupid, also incontinent. He complains of sharp pains in the left leg. Pupils: R. smaller than L.; the right eye is not sunken, but the palpebral fissure is smaller than the left. The right side of the face is less greasy than the left. Much weakness of left facial muscles. Tongue protruded slightly to the left. Motor system:—Left upper extremity powerless and somewhat rigid. Joint changes have developed. Left lower extremity rigid; the only movement that can be made is slight extension of the limb as a whole. Right lower extremity normal. Reflexes:—Arm-jerk: L. ++. Knee-jerk: R. normal; L. ++. Ankle-jerk: R. normal; L. ++. Abdominal: R. +; L. absent. Plantar: R. flexor; L. extensor. Sensation:—Touch: Definite loss on whole left side. Pinch: Sharper and sorer on left side. Position: General loss on left side. The application of cold, pinching and scraping causes more pain and a greater reaction on the left than the right side. Diagnosis:—Embolism deep in the right hemisphere involving the internal capsule and the lateral aspect of the optic thalamus (thalamic syndrome)."

No improvement occurred before transference to England two weeks later.

CASE 7. *Penetrating wound of the left common carotid artery.*—The patient was admitted into No. 1 Canadian General Hospital under the care of Lieutenant-Colonel Gunn about June 8th. He had been wounded on May 21st, 1916, and had been subsequently trephined with a negative result. A gutter wound was present in the scalp just above the left pinna, also an irregular entry wound in the left side of the neck in the superior carotid triangle at the level of the upper margin of the thyroid cartilage, and an exit wound at the posterior border of the left sterno-mastoid muscle at about the same level. Both wounds were caused by fragments of a bomb. On June 9th the patient was still completely hemiplegic and aphasic. He emitted some articulate sounds, but could answer no questions and no previous history was obtainable. The wounds in the neck were still unhealed; forcible pulsation was noted over the carotid, but no palpable tumour. The temporal pulses were equal. On auscultation a soft systolic bruit was audible over the carotid in the line of the wounds. The heart was of normal size and no murmur was audible. On June 15th a severe secondary hæmorrhage occurred and the common carotid artery was ligatured by Lieutenant-Colonel Hutchinson. An extensive laceration of the vessel was discovered in the upper third of its course. The operation was followed by an immediate slight improvement in the paralytic symptoms, the next day some words could be spoken, and eight days later some movements of the leg could be made. The patient was shortly afterwards transferred to England still improving.

CASE 9. *Non-perforating injury to left common carotid artery.*—The patient was admitted into the St. John Ambulance Brigade Hospital under the care of Major Maynard Smith in January, 1916. He was wounded on Jan. 4th by a rifle-bullet which entered the left side of the neck opposite the centre of the anterior border of the sterno-mastoid muscle, and passing obliquely transversely emerged just in front of the right angle of the mandible. The man was not rendered unconscious, and one hour later he lost power in his right arm, and experienced for two days much difficulty in speaking: "Couldn't say what he wanted to." His lower extremities were never affected. Steady improvement took place, and a week later (June 11th) speech was almost normal, the wounds were practically healed, no abnormal pulsation

Case.	Medical Officer.	Date of wound.	Position of wound and missile.	Local pulsation or thrill and murmur.	Temporal pulses.	Sympathetic paralysis.	Central nervous system.	Progress and complications.
1	Private ——. (Major Davies-Colley.)	19/5/15	Small incised wound over left sterno-mastoid at level of angle of jaw. Shell.	Marked pulsation and thrill, latter felt in left tonsil, where it seems under finger. Loud machinery murmur. Pulse 80.	Equal on the two sides.	Pupils right > left. Left palpebral fissure narrowed.	Slight weakness right face and tongue to right side. Motor system:—Upper extremity: L., normal; R., no power of movement. Lower extremity: L., normal; R., some tone, won't move on order, withdrawal on pricking sole. Sensory system:—Position: Much loss right hand and arm. No further tests possible. Reflexes:—Arm-jerk = +; knee-jerk, ++ R. > L.; ankle-jerk +. Abd.: R., 0; L., +. Plantar, R., extensor; L., flexor.	No improvement.
2	Sergeant ——. (Capt. S. S. Smith.)	16/5/15	Small slit near anterior border of sterno-mastoid 1 inch below angle of jaw. No exit wound. Shell.	Small circular area of induration. No abnormal pulsation. No murmur. Pulse 120 at first, fell to 84.	? Left > right.	No evidence of.	Unconscious at first. Mental condition improved. Speech not bad. Difficulty in reading and writing. Motor system:—Right-side hemiplegia.	—
3	—— (Captain A. Bradford.)	—	Entry wound middle of right sterno-mastoid on level with thyroid. Exit wound in anterior margin left trapezoid fold 1 inch lower level.	No carotid pulsation. No murmur. Pulse 142.	Absent on left side.	Pupils right > left ? Sweating more left side of face.	Right face very weak. Motor system:—Upper and lower extremities: L., normal; R., no power of movement. Slight rigidity of right limbs. Sensory system:—Reacts to pin-prick on both sides. Reflexes:—Arm-jerk: L., +; R., 0. Knee-jerk: R. > L. Ankle-jerk: R. > L. Abd: L., +; R., 0. Plantar: L., flexor; R., extensor.	—
4	Private ——. (Lt.-Col. Finley).	12/12/15	Wound back part of side of neck over trapezius opposite sixth cervical vertebra, missile retained or escaped by mouth.	No swelling or pulsation. No murmur.	? Diminished left side.	Pupils right > left. Slight ptosis.	Motor aphasia. Weakness of right face. Tongue deviates to left. Motor system:—Weakness right upper extremity. Some rigidity at elbow.	Aphasia and paralysis improved.
5	Private ——. (Lt.-Col. Finley.)	18/12/15	Entry right side of neck middle of anterior border of sterno-mastoid. Retained. (Left scalp wound.) Shell.	No pulsation or thrill. No murmur.	Equal on the two sides.	Left pupil > right.	No mental change. Motor system:—Upper and lower extremities: L., no power of movement; R., normal.	Rigidity in left arm after three days' interval which increased with a great deal of pain.
6	Private —— (Captain Wolfenden.)	—	Entry anterior border of sterno-mastoid right side 1 inch above sternum over spine. Retained over spines of 6th and 7th dorsal vertebræ. Bullet.	No pulsation or thrill. No murmur.	Equal on the two sides.	No evidence of.	Dull and stupid. Motor system:—Upper extremity: L., no power of movement; R., brachial monoplegia. Paraplegia paralysis of bladder and rectum.	No improvement took place. Transferred to England.
7	Private ——. (Lt.-Col. Gunn.)	21/5/16	Entry and exit small over left carotid. Left scalp wound; trephined; nil found. Bomb.	Soft systolic bruit; no conduction.	Equal on the two sides.	No evidence of.	Aphasic; quite conscious. Motor system:—Upper and lower extremities: L., normal; R., no power of movement.	Improved after ligature of carotid for secondary hæmorrhage.
8	Private —— (Capt. Gregory)	6/7/16	Entry 3 inches below external auditory meatus. Left. Shell.	Visible and palpable pulsation round wound. Large aneurysm developed later, with systolic bruit.	Left temporal pulse absent.	Pupils right > left.	Difficulty in swallowing and articulation. Motor system normal.	Improved after ligature of common carotid.
9	Private —— (Maj. Maynard Smith.)	4/1/16	Entry centre of anterior border of left sterno-mastoid; exit just in front of angle of jaw, right side. Bullet.	No pulsation or thrill; no murmur.	Left temporal pulse absent.	Pupils left > right.	Mental condition normal. Motor system:—Upper extremity: L., normal; R., forearm paralysed and biceps and triceps slightly. Lower extremity: L. and R., normal.	Went home nearly well.
10	Private —— (Lieut. Shields.)	3/1/16	Entry wound just in posterior margin of middle of left sterno-mastoid. Shell.	No pulsation or thrill; no murmur.	Equal on two sides.	Pupils right > left. Left palpebral fissure narrow. Left side of face more flushed.	Dull and drowsy. Motor aphasia. Right side of face weak. Motor system:—Upper extremity: L. normal; R. flaccid, distal movement very weak. Lower extremity: L. and R., normal.	Went home considerably improved. Right arm better. Speech better.
11	Private ——. (Lieut. Shields.)	24/1/16	Entry ¾ inch to right of 4 C. spine. Exit 1 inch outside right angle of mouth. Bullet.	No pulsation, thrill, or murmur.	Equal on the two sides.	Left pupil > right. Right face more flushed.	Left face paralysed (supranuclear). Motor system:—Upper extremity: L., rigid and completely paralysed; R., normal. Lower extremity: L., rigid, slight voluntary movement at hip only; R., normal. Sensory system:—Complete loss left side. Reflexes:—All increased left side. Plantar reflex extensor on left side.	—
12	Lance-Corp.—— (Capt. Burrows)	27/7/16	Irregular gaping wound about 1 inch long immediately in front of tragus. Shell (retained).	No pulsation, thrill, or murmur.	Right temporal pulse absent.	No evidence of.	Incomplete peripheral facial palsy right and slight upper neurone paresis left side. Motor system:—Upper extremity: L., flaccid and toneless, some power; R., normal. Lower extremity: L., movements weaker than right side; R., normal. Sensation diminished on left side. Reflexes diminished. Plantar reflex extensor on left side.	—
13	Sergeant —— (Capt. Kelly.)	15/4/15	Wound about level of top of thyroid. ? Bullet.	Moderate tumour 3″ × 2½ vert. Marked pulsation. Loud systolic murmur.	—	No evidence of.	Left hemiplegia complete.	Slight improvement on transfer. Not continued.
14	Lance-Corp.—— (Capt. Kelly.)	10/5/16	Oval slit ½ inch long at level of thyroid cartilage 1 inch behind anterior margin of right sterno-mastoid. Shell.	Moderate tumour, pulsation present and murmur.	Right temporal pulse absent.	No evidence of.	Considerable weakness left face and left side of tongue, eyes deviated to right. Motor system:—Upper extremity: L., flaccid, poor movement shoulder and elbow, absent at wrist and fingers; R., normal. Lower extremity: R. and L., normal. Sensory system:—Diminished sensation left arm. Reflexes:—Left abdominal absent, otherwise normal.	Operation. Gradual improvement of arm, and condition of face and tongue unaltered. Sent home.

was palpable over the carotid, no bruit was audible, and the temporal pulses were equal. The following note was made:—

"Motor system:—Right upper extremity: No rigidity; all movements of the shoulder and elbow are possible, but weaker than those of the other limb. Extension of the wrist can be made occasionally but the effort often fails, flexion of the wrist is not obtainable, and no movements of the fingers can be made. The lower extremities are normal. Reflexes:—Arm-jerk: R. +; L. —. Knee- and ankle-jerks normal. Abdominal: Right less than left. Plantar: Flexor. Sensation:—Touch and pin-prick unaffected. Position and form lowered as to right hand. Diagnosis:—Small cortical embolism."

CASE 12. *Non-perforating injury to right internal carotid artery.*—The patient was admitted into No. 20 General Hospital under the care of Captain Burrows in July, 1916. He was wounded on July 27th by a small piece of shell-casing from a shell that burst close beside him. He fell at once, and has no definite memory of what immediately followed, but he was probably rendered unconscious. He says he was able to get up in about ten minutes' time, but was unable to walk in consequence of weakness of his left lower extremity; the left upper he only discovered to be weak after he reached the hospital on a stretcher. The wound consisted in a gaping slit about an inch long just anterior to the right tragus. X ray examination showed the piece of shell behind the pharynx on the front of the body of the second cervical vertebra, where it was also palpable. The condition on August 4th was as follows:—

"The man is quite intelligent, but has slight difficulty in articulation due to facial paresis. The right temporal artery cannot be felt to pulsate. The pupils are equal and react normally. There is incomplete right peripheral facial palsy, and slight but definite paresis of the upper neurone type upon the left side. The tongue is protruded to the left, and the left side lies higher in the mouth. Motor system:—The right upper extremity is normal, the left flaccid and toneless. There is slight power of flexion in the fingers, but no power of extension, nor of adduction or abduction. Flexion and extension of the wrist are very feeble and limited in range. The shoulder and elbow movements are stronger. In forced inspiration the right side of the chest moves better than the left. The right lower extremity is normal; the tone of the muscles of the left is fair, and all movements are possible, especially the more distal, but they are weaker than those of the right limb. Reflexes:—Arm-jerks: R. normal; L. feeble. Knee-jerks: Equal and brisk. Ankle-jerks: Equal and brisk. Abdominal: R. brisk; L. almost absent. Plantar: R. flexor; L. extensor. Sensation:—Considerable alteration in the sense of touch, but no complete loss, is present in the left side of the head and trunk and the left upper extremity. Contact produces tingling. Localisation, sense of form, and position are all very defective in the left upper extremity."

Of the above five cases four are of the class in which no perforating injury was considered to be present, but they offered no differences in history or character of the symptoms from those in which either an arterial bruit, an aneurysmal sac, or the occurence of secondary hæmorrhage indicated the presence of an opening in the wall of the vessel, and hence the conditions for the formation of a thrombus to be still more favourable. Among the whole 14 cases, in six a wound was concluded to be present, in the large majority the missile was a fragment of shell, and in nine instances the missile was retained. In two of the cases the paralytic signs followed the application of a ligature to the common carotid artery, appearing on the second and fourth days respectively.

DIAGNOSIS.

The striking difference noted between the history of the development of the cerebral symptoms in these cases and that noted in those dependent on sudden cerebral anæmia following the application of a ligature to the common carotid artery needs only to be noted. Examples of the latter accident have been far from uncommon during the present war, when primary or secondary hæmorrhage has necessitated occlusion of the vessel. Hemiplegia has been prompt and complete, and in more than one instance followed by a fatal issue in the course of 24 to 36 hours. In the cases of embolism, on the other hand, the more tardy development and partial nature of the paresis has been the outstanding feature. The difficulties attendant upon the presence of coexistent signs of remote nervous injuries are sufficiently set out in the above description.

PROGNOSIS AND TREATMENT.

Opportunity has only existed for clinical observation of the patients concerned for a very limited period. Only one of the patients included in the table died, and on him unfortunately no post-mortem examination was made. Of the remainder, one was sent home practically recovered from an incomplete right brachial monoplegia and aphasia, while slight improvement had occurred in some of the others. The general impression, however, was not a favourable one. As to treatment, rest is the only resort; it may, however, be remarked as an important fact in support of the diagnosis (in favour of embolism as opposed to cerebral softening from anæmia) that in the two cases in which subsequent complications necessitated ligature of the common carotid artery neither patient suffered any increase in symptoms; in fact, in one (Case 7) the man's condition improved at once and considerably, and in the second (Case 8) steady improvement followed.

I should, in conclusion, express my thanks to Captain L. W. Shelley for his aid in the collection and arrangement of the notes of the cases dealt with.

NOTES ON THE AGGLUTINATION REACTIONS WITH OXFORD STANDARD AGGLUTINABLE CULTURES

IN A SERIES OF PATIENTS, INCLUDING THOSE EXAMINED IN A RECENT CIVILIAN OUTBREAK.

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(*Report to Medical Research Committee.*)

THE following analysis is based on a series of 275 cases, of whom 184 were soldiers ill or convalescent from overseas, 53 were civilians suffering from "enteric" during the recent outbreak in Reading, and 38 were civilians ill from causes other than "enteric." The sera of these cases were examined once or oftener at the request of the medical men in charge of the cases, while for permission to examine the sera of the non-enteric civilians we are indebted to Lieutenant-Colonel Freeman, R.A.M.C. (T.), and Major Abram, R.A.M.C. (T.). The examinations were part of the routine work carried out in the laboratories of the civil and military hospitals, and were not specially selected.

Agglutination technique.—At the outset a small number of sera were examined strictly in accordance with the instructions laid down in the "Directions" issued from the Standards Laboratory, Oxford, at the instance of the Medical Research Committee. As we found a difficulty in dealing with many sera at one time with the small number of "outfits" supplied, and as some of these agglutination tubes did not hold the amount of fluid necessary for the test, we discontinued their use.

In their stead we employed accurately graduated pipettes to deliver known volumes of serum, saline, and bacillary suspension. The standard agglutinable cultures issued from the Oxford laboratory were used exclusively, the volume of standard suspension added to each tube being 1 c.c. With this were mixed serum and saline in such proportions that when the three constituents had been added the resulting serum dilutions were 1 in 27, 1 in 54, 1 in 120, and 1 in 150 in the first four tubes respectively.

The tubes were placed in a water-bath for two hours at 50° C., but instead of reading the result at the end of 15 minutes after their two-hours' heating we left them on the bench till the following morning. Where many sera had to be done we found it most convenient to use for heating purposes Hearson's water-bath, as supplied by them for Wassermann purposes. In place of their rack we had another one of the same size made, but constructed to hold 225 agglutination tubes at once.

The readings were all carried out by the same observer, and to facilitate accurate reading we always used the same source of light. This was an electric-light bulb let in through a slit in the top of an ordinary soap-box whose interior had been painted black. Against this background the readings were made, and to detect the end-point we used a pocket lens.

The sera were always put up in the first instance in the four dilutions named above against standard suspensions of

B. typhosus, B. paratyph. A, and B. paratyph. B respectively. If the end-point had not been reached in 1 in 150 a further series was put up, and so on till an end-point was obtained. The highest dilution we had occasion to use was 1 in 21,333.

As, with a few exceptions, all the sera were examined by the volumetric method and not that recommended by Professor Dreyer and his colleagues, no attempt was made to interpret the results, hence the varying sensitiveness of the bacillary suspensions was not reckoned with.

Comments.—The substitution of the graduated for the Oxford dropping pipette was made not because we regarded the latter as less accurate for ordinary practical purposes, but because of the greater convenience of the former. We mention this because Hort has stated that he has not found the method of sufficient accuracy for routine work on a large scale.

Strictly speaking, inasmuch as the Oxford pipette is used to deliver a certain number of drops of fluids whose surface-tension differs, there must be a small margin of error in the accuracy of the resulting serum dilution. In practice, however, this appears to be negligible where the macroscopic end-point to be determined is a crude one in comparison with an end-point in terms of chemistry. Inaccuracies, however, may occur in the counting of the drops delivered. This is all the more likely where the operator has many sera to put up and when there is more opportunity for temporary mental distraction from the immediate work in hand—viz., the counting of drops. This may account for Hort's statement.[1]

Of course, the volumetric method is not absolutely free from the same objection, but it is considerably less liable to error in so far as there is no need for arithmetical concentration. In our series of cases wherever any large discrepancy was observed between the two readings, or wherever a doubt existed as to the dilutions made, the test was repeated. We believe that the volumetric method takes up less time than the drop method and that the operator is less liable to make mistakes.

Collection of blood.—In order to obtain a sufficiency of blood there was only one method to adopt and that was to remove a reasonable quantity by venipuncture, generally from the median basilic vein. This was done in every case. It involves considerably more trouble where several sera have to be examined in the same day, inasmuch as the syringe must be sterilised between each case. Apart from the time spent during sterilisation, the actual collection of the specimen is easier since there is no trouble encountered in securing a sufficiency, and as far as the patient is concerned no greater pain is felt than by other methods. It has a further advantage over other methods in that blood can be secured at the same time for culture purposes.

Results: Group I.

This group comprises a series of 115 men whose bloods were examined twice or oftener. These are divided into three sections.

Section 1 includes those whose bloods showed the presence of agglutinins for paratyphoid bacilli with or without agglutinins for B. typhosus. This comprises 71·6 per cent. of the cases in Group I. They are divided up as follows:—

TABLE I.

No. of cases...	81			
Agglutinating B. para. A	31 cases or 38·2 per cent.			
,, B. para. B	43	,,	53·0	,,
,, B. para. A and B	7	,,	8·6	,,

Comments.—When the cases began to come in from the Mediterranean towards the end of 1915 it speedily became evident that the clinical diagnosis was quite untrustworthy. The majority of the cases arrived as "enterics" or "dysenteries," but without any bacteriological record to support this. Out of 133 men who were questioned only 11, or 8·2 per cent., were able to state that their blood had been examined. While the actual number examined was probably larger than could be ascertained from the patients, it was obvious that if the clinical diagnosis were to be accepted at its face value the percentage of typhoids would indeed be large. That this was not so, and incidentally furnishing indirect evidence that the diagnosis made abroad rested on clinical grounds only, became evident on bacteriological investigation.

The serological methods above described were employed, as by the time the patients reached us the possibility of finding the causal organism in the blood was reduced to a minimum. This latter method was employed in many of the cases alongside the serological with results so poor that it was discontinued except in special cases. Bacteriological examination of the excreta we found to be of only a little more value than blood culture owing to the number of negative results obtained, and to be of little value for immediate diagnosis, for instance, in those cases which were negative on two or three occasions, to be followed on a subsequent occasion by the presence of infective bacilli. As a matter of interest B. para. A was isolated from the fæces of 5 men only in this section of 81 cases, and B. para. B from 8 men, the blood of one of the latter, however, being devoid of agglutinins for B. para. B.

As most of the men had been inoculated against typhoid, but not against paratyphoid, an endeavour was made to obtain the bloods on at least two occasions. It was pointed out that while one examination was probably sufficient to enable one to state that the patient had been infected with paratyphoid it was not sufficient for a diagnosis of typhoid, inasmuch as the inoculated persons would show the presence of typhoid agglutinins in the blood. It ought not to be necessary at this stage to refer specially to the need for two or more examinations, but the fact does not yet appear to be generally recognised by clinicians. Moreover, as the men are now being immunised with a triple vaccine the need for repeated serological examination will be greater, since hitherto a single examination has sufficed to determine whether a paratyphoid infection was present or absent.

Of the 115 men referred to in Group I., 81, or 71·6 per cent., showed the presence of para. agglutinins in the blood, indicating a more or less recent paratyphoid infection. The relative proportions of those with para. A and para. B agglutinins respectively are given in Table I.

Omitting for the moment those which agglutinated both paratyphoid A and B, it will be seen that para. B infections were more frequent, so far as our results go, than para. A infections. This is further supported by the figures which we give above relative to the proportion of cases from which paratyphoid organisms were recovered. The relative proportions in our series differ from those recorded by some other observers, notably those who were working in the East, while they agree more or less closely with the figures given by Professor E. Glynn and Dr. E. C. Lowe,[2] who suggest that the difference may be explained by the fact that after the month of October paratyphoid A was more common than para. B. In 68 of our series the date of onset of illness was more or less accurately ascertained, with the result that up to the end of October the proportion of para. A to para. B was 1 : 1·79, while after that date the proportion was 1 : 1·07. These figures, while not so striking as those of Glynn and Lowe, show a slight increase in para. B over para. A up to the end of October, while after that month they are practically equal.

While the seasonal incidence may be the explanation, we cannot help thinking that the reason for the difference is to be sought for in the character of the stimulus which calls forth the production of agglutinins. In other words, it would be explained by the assumption that B. para. A is a weaker stimulus than B. para. B, or that the agglutinins resulting from the A stimulus are more transient than those produced by B. para. B.

If this assumption be correct, one would expect to have a larger number of positive A agglutinins, the nearer to the infecting point the blood is examined, and conversely, the longer the interval between onset and agglutination the fewer will be the number of those previously infected with B. para. A which will show the presence of A agglutinins. The same thing, of course, will hold good as regards B typhosus and B. para. B, but the point we wish to make is this, that the interval during which para. A agglutinins can be found in the blood is probably shorter than in the case of the other two infections.

Further, when a paratyphoid infection occurs in a person already inoculated against typhoid only, a new stimulus to specific agglutinin formation is introduced. That this new stimulus is not without an influence on the agglutinin-producing mechanism already called into being as a result of the typhoid inoculation appears to be the opinion of several observers. This being so, we should expect the typhoid agglutinin output to vary directly as the ability of the new stimulus to produce agglutinins. Accordingly, if the explanation offered for the discrepancy between various observers in the relative numbers of para. A and para. B

infections be correct, we should expect to be able to trace the same influence at work on the typhoid agglutinin content.

TABLE II.—*Showing Percentages of Cases with Agglutinins for B. Typhosus in a Dilution of 1 in 150 or more.*

Of those agglutinating	Typhoid only	62·5 per cent.
,, ,, ,,	Typhoid and Para. A ...	65·5 ,, ,,
,, ,, ,,	Typhoid and Para. B ...	90·2 ,, ,,

From Table II. we see that those who have been infected with paratyphoid bacilli after a previous inoculation with typhoid bacilli yield a greater percentage having a high typhoid agglutinin content than those who have not been so infected. In other words, those with agglutinins for T. only do not agglutinate T. so strongly as those with a mixed infection. It is interesting in this connexion to note that

TABLE III.—*Showing Nature of Curve of Paratyphoid Agglutinins Compared with that of Typhoid Agglutinins in Same Series.*

—	Paratyphoid.				Typhoid.			
	No. of cases.	Stationary.	Rise.	Fall.	No. of cases.	Stationary.	Rise.	Fall.
Para. A ...	31	3·2 %	22·5 %	74·1 %	29	89·6 %	0	10·3 %
Para. B ...	43	25·5 %	13·9 %	60·4 %	41	60·97 %	7·3 %	31·7 %
Total ...	74	16·2 %	17·5 %	66·2 %	70	72·8 %	4·2 %	22·8 %

TABLE IV.—*Showing Average Time Elapsing from Onset till First Agglutination and Average Interval between Readings.*

—	Stationary.		Rise.		Fall.	
	Months from onset.	Interval.	Months from onset.	Interval.	Months from onset.	Interval.
B. Para. A	2·5	11 days.	1·9	16·6 days	1·65	23·3 days.
B. Para. B	2·2	19 ,,	1·8	21 ,,	2	22·3 ,,
Typhoid in Para. A Series	1·78	21·8 ,,	0	0 ,,	1·5	20 ,,
Typhoid in Para B Series	1·97	20·8 ,,	2·75	18 ,,	2·2	23·1 ,,

TABLE V.—*Showing Percentage Rise or Fall by more than One Tube in the Series of 113 Cases.*

—	T. agglutinins in typhoid only series.	T. agglutinins in paratyphoid series.	Paratyphoid agglutinins in paratyphoid series.
Rise	6·25%	1·23%	9·8%
Fall...	18·75%	8·6 %	39·5%
No. of cases...	32	81	81

the para. A series is not much higher than that with T. agglutinins only, whereas in the para. B series the increase in the T. titre is very marked. This, it seems to us, is further evidence that a paratyphoid infection raises the T. titre, but that the rise is greater or takes place in a greater number of cases where the infecting agent is B. para. B than where it is B. para. A. Another possibility is that while both may be stimulated to produce an equal rise in the T. agglutinin content, the effect of the stimulus may be more evanescent where the infecting agent is B. para. A. The same stimulus effect has been noticed in non-inoculated civilians who were suffering from a mixed typhoid and paratyphoid infection. (Table VI.)

TABLE VI.—*Showing Comparative Percentages of Cases with T. Agglutinins with a Titre of 1 in 150 or more.*

—	Of those agglutinating T. only.	Of those agglutinating T. and Para. T.
Cases examined twice	62·5 %	79·2 %
Cases examined once	57·8 %	68·9 %
Uninoculated civilian cases	64·5 %	80·0 %

In view of this we should expect a considerable difference in results according to the interval which has elapsed between onset and agglutination. It does not follow, because there is a great subsequent fall in the para. titres, that we should expect a corresponding great fall in the T. titres of the same cases. We must take into account another factor—viz., the interval between the point of infection and the point at which agglutination is carried out. It is interesting to see how far this is borne out by a comparison of Glynn and Lowe's figures, bearing in mind that their cases were examined well on in convalescence, whereas ours were examined on an average 1·9 months from the outset of the illness. In their analysis we found that 14 per cent. of the T.A series and 51 per cent. of the T.B series showed an agglutination titre for T. in 1 in 250 or more as compared with 48·2 per cent. and 73·1 per cent. respectively, which in our series agglutinated in a dilution of 1 in 320 or more. Moreover, 10·3 per cent. of our T.A series fell as regards their T. agglutinin content, while 31·7 per cent. of the T.B series fell as regards their T. agglutinin content.

These figures suggest that the influence of the A stimulus on the T. agglutinin production had probably largely disappeared, while the influence of the B stimulus was still present. That a fall took place in the short period of 23 days between the two agglutinations rather points to the conclusion that the induced T. agglutinin curve was falling rather more rapidly than a simple T. inoculation curve would do. In other words, that after the induced rise the fall was not a repetition of the slow fall seen after inoculation.

We are inclined, therefore, from a consideration of the above to think that paratyphoid infection raises temporarily the existing inoculation titre for typhoid. In para. A infections the influence of the A stimulus on the T. agglutinin production is less in amount or more transitory in its effect than in the case of B infections, and in both cases the fall from the top of the induced T. curve is probably more rapid up to a certain level than would be the case if the decline of the induced curve imitated that which follows a simple T. inoculation. After that certain point (probably near the level which the T. curve would naturally have arrived at) the curve goes on to decline at the same rate as it would have done if no undulation of the curve had occurred.

With one doubtful exception, of the 74 cases agglutinating para. A or para. B none had been inoculated with a triple vaccine. The doubtful case is said to have had a triple vaccine four months before agglutination. He agglutinated B. para. A, the curve showing a marked decline between the two readings, while the T. titre remained stationary, and agglutinins for B. para. B were absent on both occasions. None of the other para. agglutinins in this series of 74 cases can be ascribed to a previous immunising inoculation. While a few were cases of relapse, 50 per cent. of the number were still in a condition of pyrexia, and, as a matter of fact, only 16·2 per cent. gave stationary para. readings, as compared with 72·85 per cent. of a total of 70 of the same cases which showed a stationary T. curve, and with 16·6 per cent. in a series of 12 civilian typhoids. The movement in the T. curve in the paratyphoid series we have tried to show above is probably largely explained by the effect of an A or B stimulus to a person already provided with a mechanism for the ready production of T. agglutinins. We have no evidence in the above section or in any of the others to follow that the para. agglutinins were to be regarded as co-agglutinins occurring in the course of a true typhoid infection. In 4 of the 74 cases paratyphoid agglutinins only were present, while paratyphoid bacilli were isolated from 17·5 per cent. of the series.

In addition to the fact that a high para. titre was present in a great number of the paratyphoid cases, we found that there was a corresponding difference in the extent of excursion of the curve between the two readings. Taking together all cases agglutinating T. A, T. B, or T. A B, we find that 49·3 per cent. of them showed a rise or fall in the paratyphoid curve of more than one tube as compared with 9·8 per cent. of the same series showing a rise or fall of the T. titre to the same extent. The total number of cases from which this is estimated was 81. Further, out of 81 cases 43·2 per cent. possessed a paratyphoid titre greater than their T. titre, which latter we believe to have been due to T. inoculation, while 7·4 per cent. yielded a para. titre of equal value with the T. titre.

These figures are further evidence that the paratyphoid curve was due to infection, while the typhoid curve was the result of inoculation, but disturbed by the para. stimulus.

In only 3 cases out of 70, or 4·2 per cent., was there a rise in the typhoid curve. In all 3 the paratyphoid titre was higher than the T. titre. On the first agglutination, and in only one, did the T. titre reach the same level as the para. titre. These we regard as examples of active para. infections where the para. titre is increasing and, owing to this stimulus, the T. titre is also on the rise.

Seven cases were found to agglutinate both A and B, the average time between onset and agglutination being 2·5 months, while the interval between the two readings was 17·5 days. None of these, so far as we could learn, had been inoculated with a triple vaccine except one, and he was done for the first time on the morning of the very day on which he reported sick. From his urine we have isolated B. para. A, and on inquiry we learnt that some months previously he had an attack of diarrhœa for two weeks, which, however, did not lay him up. His agglutination result was 1 in 320 for para. A and 1 in 54 for para. B on both examinations. In this case it is just possible that the para. B agglutinins were due to his inoculation. In 3 of the others the para. A titre was considerably greater than the para. B titre, and in 2 other cases the reverse held good. In the seventh case the titre of A and B was equal, but the A fell between the two readings, while the B remained at the same level.

In 4 of the 6 cases just mentioned the T. titre remained stationary, in 1 it fell below the higher of the two para. readings, and in 1 it rose while the para. A element rose in equal amount. In the same series of 6 cases the para. element which gave the higher titre fell in 3 cases between the readings, in 2 it remained stationary, and in 1 it rose. Of the lower of the two paratyphoid elements in the series of 7 cases none gave a higher reading than 1 in 54 except one which agglutinated both A and B in 1 in 533. Of these 2 had fallen to zero in an interval of 20 days. Finally, of the 6 cases mentioned 3 gave a lower T. titre than para. titre, 1 agglutinated T. and A in equal amount, and 2 were slightly higher as regards their T. titre, but one of these fell on a subsequent reading below the para. level.

Having regard to these figures and to the fact that none had received a paratyphoid vaccine (except one from whom paratyphoid bacilli were recovered), we are of the opinion that all of these are examples of paratyphoid infection, and that there is no evidence of infection by B. typhosus. The only point of difficulty is to explain the co-existence of A and B agglutinins. That the higher of the two titres in each case represents the response to the immediately active infection seems indicated from the first of the series, from which we recovered the organism. The question as to whether the weaker of the two paratyphoid sets of agglutinins in each case is the result simply of co-agglutination, is a co-infection, or represents the end result of a previous para. infection must be left for the present.

Section 2.—Section 2 includes all those cases, 32 in number, which were found to agglutinate T. only, after two examinations. These form 27·8 per cent. of the total bloods examined twice. An analysis of these is set out in comparison (Table VII.) on the lines of that given by Glynn and Lowe.

TABLE VII.

—	Stationary.	Months from onset.	Interval.	Rise.	Months from onset.	Interval.	Fall.	Months from onset.	Interval.
	%		days.	%		days.	%		days
32 cases with T. agglutinins only	50	1·9	16·2	6·2	3·5	18	43·7	1·5	17·7
Typhoid in para. A and para. B series, 70 cases	72·85	1·8	21·3	4·2	2·75	18	22·8	2	22·5
Para. agglutinins, 74 cases	16·2	2·25	18·4	17·5	1·85	18·8	66·2	1·84	22·3

In inoculated persons a serological diagnosis can only be made after two or more readings separated by an interval. Since, however, there is a steady fall in titre after the inoculation maximum has been reached, it follows that a fall in titre between two readings may indicate either a typhoid infection or simply the natural diminution in the agglutinin content after inoculation. In order to discriminate between the two, one must take into consideration the time factor, more especially the interval between the readings. In the case of the normal fall in a person not suffering from typhoid, the fall is a comparatively slow one, and in order to detect an appreciable difference the interval between the readings must be considerable. Some indication of this is given in the comments on the paratyphoid series where, we believe, no typhoid infection occurred.

In our series of 70 cases we find that 72·85 per cent. were stationary as regards their T. curve between the two readings, although we must bear in mind that these cases were also under the influence of a paratyphoid infection. Where the case is genuinely one of typhoid infection occurring in an inoculated or uninoculated person, we shall expect to find a steeper decline in the curve of the T. agglutinins, or, in other words, the interval allowing of a fall in the curve will be considerably shorter than in the case of non-typhoid persons. Another way to put it is that the downward excursion of the curve in a given period will probably be greater.

In this series we intend to claim all those as typhoid infections whose curve had altered during the two readings for the following reasons. In our series of 32 cases 50 per cent. only were stationary as compared with the 72·85 per cent. whose T. curve did not alter in the case of those infected with paratyphoid.

Of the 50 per cent. which showed a variation in titre 6·2 per cent. were of the nature of a rise. As these patients were not infected with paratyphoid bacilli so far as we know, we claim them as genuine cases of typhoid fever. One had been inoculated eight months before, and showed a rise of three tubes in 16 days, followed by a drop of two tubes after a 77-day interval. The extent of rise in both cases suggests that it was not due to any variation of sensitiveness on the part of the standard cultures used, supposing for argument's sake that the same batch of culture was not used on both occasions.

There remain 43·7 per cent. which showed a decline in the agglutination titre. As this decline occurred in the short average interval of 17·7 days, the first reading being taken on average 1·5 months from the onset, we believe we are justified in calling them cases of typhoid infection. Had the interval between the readings been longer, as, for instance, 4·8 weeks mentioned in Glynn and Lowe's paper, the fall in titre could not have been ascribed to a typhoid infection with the same degree of certainty. Further, those which fell one tube only were 8 in number, or 25 per cent. of the 32.

It is interesting to note that in those which fell one tube only the first reading was made 2·1 months from the onset, whereas those which fell two or more tubes were examined first 1·3 months from the onset, suggesting that the nearer we get to the infecting point the more rapid or the steeper is the rise or fall.

Of those which fell two or more tubes one had never been inoculated, while the others had been inoculated 21, 12, 11½, 11, and 9 months before respectively, the average interval between their two readings being 21·1 days. It is further interesting to note that in 62·5 per cent. of the 32 cases the titre was 1 in 150 or more. Of the 16 cases whose curve altered 14, or 87·5 per cent., had a titre of 1 in 150 or more, while of the 16 whose curve remained stationary only 5, or 31·2 per cent., had a titre of 1 in 150 or more.

For these reasons we are inclined to claim all 16 cases (50 per cent.) whose curve altered as cases of typhoid infection. Out of 115 men whose bloods were examined twice this forms a total of only 13·8 per cent. This is certainly a slightly larger percentage than that found by Glynn and Lowe (under 10 per cent. in a series of 300 cases). But it must be borne in mind that their cases were examined when well advanced in convalescence, whilst our agglutinations were carried out nearer the infecting point. Even our figure is a remarkable and irrefutable argument in favour of preventive inoculation, especially as only one of the 115 men died, whereas in the epidemic amongst uninoculated civilians out of 53 cases 15 per cent. died.

The single case which died agglutinated B. typhosus on both occasions in 1 in 50, but had no agglutinations for para. A or B. From him, however, we isolated B. para. B, which we take to be the causal organism in this case. We can therefore say that none of those which agglutinated T. only, died of a T. infection.

Section 3.—Out of this series of 115 cases only 2 were found which did not agglutinate T., A or B, at either agglutination. One had been inoculated once and against typhoid

only, five months before, and the interval between the two examinations was 22 days. The other had never been inoculated; the interval between the two readings was 19 days. As both were examined for the first time two and a half months from the onset of the illness we think it rather difficult to state definitely whether they had typhoid or not. The strong probability is that neither had had typhoid, though it is possible, especially in the second case, that the infection agglutinins had disappeared owing to the slightly longer interval which elapsed between the onset and the first agglutination.

Group II.

In this group are included 69 soldiers whose bloods were examined once only. The majority of these were convalescent, the first agglutination being made 2·25 months after onset in the case of those with agglutinins for T. only, and 2·69 months in the case of those with para. agglutinins as well. Several were examined, not because there was any suspicion of "enteric," but because the blood was being taken for some other purpose. In these cases the patients were suffering from some other disease—e.g., tuberculous meningitis, pneumococcal meningitis, and wound infections.

In view of a recent statement made by Captain H. L. Tidy, R.A.M.C.,[3] which has already been completely refuted, we desire to state that in none of those cases suffering from diseases other than typhoid did we find any evidence of a disappearance of agglutinins, although in every case the patient was in a condition of pyrexia. Only one, suffering from wound infection, had no agglutinins for T., A or B, and he had never been inoculated! Since then we have had occasion to make many blood cultures in cases of pyrexia due to wound infection, and in these cases also we have found no evidence to support the contention that inoculation agglutinins disappear in cases of pyrexia not due to typhoid.

With 12 exceptions who came from France, all the others, so far as could be learnt, came from the East. An analysis of these cases appears in Table VIII. 43·4 per cent. of

TABLE VIII.

—	T. only.	T., A.	T., B.	T., A, B.	A, B.	No agglutinins.
Cases	38	6	15	8	1	1
Per cent. ...	55	8·6	21·7	11·5	1·4	1·4

these 69 cases showed the presence of para. agglutinins. Out of 41 of the 69 cases whose inoculation data were available only 1 had been inoculated against paratyphoid, and his blood showed complete absence of paratyphoid agglutinins, even in a 1 in 27 dilution. We think it highly probable, therefore, that all the 43·4 per cent. had had a paratyphoid infection. It is of interest in passing to note the smaller percentage—viz., 8·6 per cent.—which show the presence of para. A agglutinins, as compared with 26·9 per cent. recorded in the series whose bloods were examined twice and who were nearer the infecting point.

Of those which agglutinated T. only, 2 had been bacteriologically examined elsewhere and had been diagnosed as typhoid on an increasing Widal. Other 2 stated that they had been diagnosed as "enteric" abroad, but there was no documentary evidence of this. There are thus 2 more cases of definite typhoid, and probably 4, to be added to the figures already given in another section. It may even be slightly larger still, inasmuch as 6 out of 17, or 25 per cent., whose data are known agglutinated in a titre of 1 in 150 or more, especially in view of the fact that the average time elapsing since inoculation in these 17 cases was 9·8 months. Another possible explanation is that some of these had had a previous para. infection, the agglutinins for which were no longer present, but the effect of their stimulus was still felt in a heightened T. curve. At the same time, from a consideration of the typhoid agglutinins occurring in uninoculated civilians, we think it right to state that inferences based on mere height of titre may be fallacious, owing to the great variation in individual response to a T. infection or to a T. inoculation.

Of those agglutinating para. B that organism had been recovered from the blood in France in 2 cases, while a third had been diagnosed para. B on an increasing Widal. From one agglutinating T. + A and B we recovered B. para. B from the blood, stools, and peritoneal cavity, though no perforation was found at the operation. From two others we isolated B. para. B from the fæces. Of this series, in all except one, the titre for one of the paratyphoid groups of organism was greater than for the other. In only 3 was the lowest of the 2 para. titres 1 in 27. The typhoid titre was 1 in 150 or more in 57·8 per cent. of those agglutinating T. only, while in those agglutinating paratyphoid as well it was 68 9 per cent., again showing, though not so markedly, the stimulus effect of a para. infection.

Of the 41 whose data are known all had been inoculated against typhoid except one, and his blood contained no agglutinins for T., A or B. He was suffering from wounds. One who had been inoculated against typhoid had only agglutinins for paratyphoid bacilli. Out of the remaining 28 whose data are unknown one had no agglutinins for T., A or B.

It is interesting to note that a titre of 1 in 150 or more for para. A was present in only 33·3 per cent. of the cases agglutinating B. para. A, while it was present for B. para. B in 53·3 per cent. of the cases agglutinating B. para. B, showing that the further we go from the infecting point the less does the agglutinin content for the infecting organism become, while what we regard as the T. inoculation titre, after being reinforced by the para. infection, remains higher for a longer period of time. It is of interest to compare these figures with the much higher ones, viz., 70·9 per cent. of those agglutinating B. para. A and 62·79 per cent. of those agglutinating B. para. B in the series of 74 examined twice, where the examination was made near the infecting point.

Group III.

In this group we record the results of 53 civilians whose agglutinations were carried out as described above, using the Oxford Standard cultures. The cases formed the bulk of a small epidemic which broke out in Reading at the end of December, 1915. As none of these had been inoculated nor had typhoid fever before, we thought it might be of interest to record the results. Unfortunately it was only possible to make two examinations in 13 out of the 53, but as they were all uninoculated one examination was sufficient as a rule to establish a diagnosis.

It was evident at the outset that we were either dealing with cases some of which contained co-agglutinins or we were dealing with a mixed infection. The latter we believe to have been the case, and in all probability the infection came from a military source, either through some flaw in the system of water-carriage or through direct contact.

Of the 53 persons suffering from an "enteric"-like disease 50 cases, or 94·3 per cent., had agglutinins for B. typhosus and a few for paratyphoid bacilli as well. Of the remaining 3 one was able to agglutinate B. para. B only, while the other two did not agglutinate T., A or B even in a 1 in 27 dilution. One of these was examined first on the eighth day of illness and again on the twelfth, with negative results each time. Post-mortem, however, revealed extensive ulceration and B. typhosus was recovered. The other case was examined once only—viz., on the thirty-first day—and although negative this patient had a hæmorrhage, which, taken in conjunction with the other clinical features of the case, justify us in calling it typhoid or paratyphoid. An analysis is shown in Tables IX. and X.

TABLE IX.

No. of cases.	T. agglutinins only.	T., A.	T., B.	T., A, B.	B only.	No agglutinins.
53	58·4%	5·6%	26·4%	3·7%	1·8%	3·7%

TABLE X.

No. of cases.	Stationary.	Days from onset.	Interval.	Rise.	Days from onset.	Interval.	Fall.	Days from onset.	Interval.
	%		days.	%		days.	%		days.
12	16·6	9·6	7·6	58·3	11	16·8	25	14·7	19·2

Those in Table X. were agglutinated on two occasions. The ages ranged from 6 to 54 years, and the two sexes were almost equally divided. 37 7 per cent. showed the presence of paratyphoid agglutinins as well as or without T. agglutinins. The percentage agglutinating B. para. A is much smaller than that agglutinating B. para. B. As regards titre, 76·9

per cent. of these with T. agglutinins, whether or not accompanied by para. agglutinins, were able to agglutinate B. typhosus in 1 in 120 or more, the high-st point reached in any being 1 in 5333. Of those agglutinating T. only 64·5 per cent. had a titre of 1 in 150 or more. Of those agglutinating paratyphoid as well as typhoid, the titre was 1 in 150 or more in 80 per cent. This suggests that the T. titre is higher in cases infected with typhoid and paratyphoid organisms than it is in pure T. infections. 60 per cent., or 3 cases out of 5 yielding A agglutinins were able to agglutinate B. para A in 1 in 120 or more, the highest being 1 in 150. In 1 of these cases the A titre was higher than the corresponding T. titre. 52·9 per cent., or 9 cases out of the 17 which agglutinated B. para. B were able to agglutinate in a dilution of 1 in 120 or more, the highest being 1 in 5333. In one of these cases also the B titre was higher than the T. titre in the same serum. In another case the T. titre fell four tubes as against one tube in the B titre in the same time. The percentage of high para. titres would probably have been greater if all cases had been examined at least on two occasions. Of those whose data are available, whether examined once or twice, the average time elapsing between onset and first agglutination was 15·8 days.

That there was a definite co-existing paratyphoid infection in a certain number of the cases we believe is supported by the following facts. B. paratyphosus B was isolated from the stools of one patient (age 1 year) whose blood was not sent for agglutination, and who is therefore not included in the above series of 53. This case was clinically one of typhoid or paratyphoid infection. It is interesting to note that in the above series are included 3 other members of the same family from which this child came. One of them had agglutinins for T. and A. another for T. and B, and the third for T. only.

From another case with agglutinins for T. and B, B. para. B was recovered from the urine. In still another case already mentioned in the table there were agglutinins for B. para. B only. Finally, in one or two cases absorption tests were carried out which showed that the para. agglutinins in the cases examined were not of the nature of co-agglutinins.

Only 4 of these with agglutinins for paratyphoid bacilli agglutinated in 1 in 27 only on the single occasion of examination. One of these examined on the eighth day of illness also agglutinated B. typhosus in 1 in 120 only. Two were examined on the sixteenth day and had also T. titres of 1 in 150 and 1 in 1600 respectively, and the fourth with T. A agglutinins, examined on the twenty-first day, had a T. titre of 1 in 150. From the stools of a brother of this patient B. paratyphosus B was recovered. The remaining 31 cases, or 58·4 per cent., showed no trace of paratyphoid agglutinins even in 1 in 27, although 64·5 per cent. of them agglutinated B. typhosus in 1 in 150 or more, the titre in 22·5 per cent. running into four figures, of which the highest was 1 in 5333. Of these which agglutinated both para. A and para. B, one had a titre of 1 in 150 for A and 1 in 120 for B, while the other was 1 in 150 for A and 1 in 320 for B.

In view of the above facts we conclude that those cases with paratyphoid agglutinins from whom no paratyphoid bacilli were isolated were in all probability cases of mixed infection, and that none of them is to be regarded as examples of co-agglutination. Probably paratyphoid and typhoid bacilli would have been isolated in a greater number of cases had the excreta been systematically examined. Only a certain number were examined, and that on one occasion only when the patient was convalescent and ready to be discharged.

Group IV.

The last group embraces a series of 38 civilians whose bloods were examined once or oftener, but who were suffering or convalescent from other diseases. Of these, 15 were at first clinically suspected of typhoid, but none of them agglutinated T., A or B, even in 1 in 27, and as a matter of fact turned out to be ill from other causes. The remaining 23 bloods were taken at random from in-patients suffering from diseases other than typhoid. 19 of them were negative to T., A and B even in 1 in 27 dilution, while 4 gave different readings. That is to say, out of 38 civilians not suffering from typhoid or paratyphoid 89·4 per cent. contained no agglutinins for T., A or B even in a dilution of 1 in 27, while 10·5 per cent., or 4 cases, showed the following.

Two agglutinated B. typhosus up to 1 in 120. One—a woman—was suffering from colitis of two years' duration and empyema. She had not been inoculated, and could furnish no history of an attack of, or contact with, typhoid. The other was an old soldier who had served in India, and who said he had never consciously had typhoid and was never inoculated. In this case, however, we think there is a strong suspicion that he had at least been in contact with typhoid.

A third—a woman of 71—agglutinated B. typhosus up to 1 in 50. She stated that she had never had typhoid and had never been inoculated. At the age of 21, however, she had lived in the same house where one of the inmates died from typhoid. The fourth agglutinated B. para. B up to 1 in 50. He was in a hospital with Charcot joints. He had never had typhoid, had never been inoculated, and could give no history of contact. Out of the 4 cases, therefore, in one there was a certainty of contact with typhoid and in the other a strong suspicion.

Summary and Conclusions.

1. The paper is based on the serum reactions of 275 patients, of whom 184 were soldiers. 165 of these came from the Mediterranean, 18 from France, and 1 was an R.A.M.C. orderly who contracted paratyphoid in Reading. 91 were civilians, of whom 53 were cases of typhoid or paratyphoid occurring during the recent Reading outbreak, while the remaining 38 were not suffering from the typhoid-paratyphoid group of diseases, but were used as controls.

2. The tests were carried out on the principle recommended by Dreyer and his colleagues, but with a slightly different technique. We believe the drop method is more liable to personal error, takes up more time, and, owing to the difference in surface tension of the various liquids used, to a certain extent possesses an inherent inaccuracy. While the drop method is scientifically inaccurate, we should think that, owing to the gross nature of the end-point of the reaction, the margin of error arising from surface-tension may be neglected for all practical purposes. In our examinations we have used a volumetric method, delivering the fluids from accurately graduated pipettes.

3. We have used the standard agglutinable cultures throughout as supplied by the Standards Laboratory, Oxford, at the instance of the Medical Research Committee. We have found them thoroughly satisfactory for routine work, and the provision of such cultures has been a great boon at a time when the resources of the laboratory were being taxed to their utmost.

4. We believe this method to be the simplest, most accurate, and the most suitable of all agglutination methods where routine work is concerned.

5. The same observer should, if possible, carry out all the readings; these should be made against a black background, with a constant intensity of artificial illumination, and a hand lens employed to detect the end point.

6. Collection of blood is best obtained by venipuncture, by which means sufficient blood can at the same time be got for culture purposes.

7. Statistics based on clinical grounds alone can be of no value where typhoid and paratyphoid are concerned in cases which come from the East. The great majority of our cases arrived with a diagnosis of "enteric," whereas out of 115 cases only 13 per cent. at the outside could be claimed as true typhoid. The mortality among these typhoid cases was nil, and offers a marked contrast to the 15 per cent. mortality among 53 uninoculated civilians.

8. Out of the 115 cases examined twice, 71·6 per cent. contained agglutinins for paratyphoid bacilli, and out of the whole number of military cases 111, or 60·3 per cent., agglutinated paratyphoid organisms.

9. Paratyphoid infections raise the T. titre in inoculated persons. The stimulus effect, however, appears to vary according to the nature of the para. infection. The para. A stimulus is probably less in amount or more transitory in its effect than that of para. B. It is possible that as a result of a para. infection the T. inoculation curve rises from the point to which it has normally attained to a certain maximum. Having attained this, there is a somewhat sharper decline of the T. curve in T. A cases as compared with that in T. B cases. Hence in such cases an alteration of the T. curve between two readings, separated by a short interval, is more likely to be detected the nearer the examination is to the onset of the illness. If examined well on in convalescence, the T. curve, at least in T. A cases, has

probably begun to fall at its normal post-inoculation rate, and a change in T. titre will be less frequently encountered where the interval between the readings is a short one. We do not think that, having reached its maximum, the induced rise in the T. curve falls continuously from that point at the steady rate seen after simple inoculation.

10. That para. B infections are more common in these cases is probably more apparent than real, and is probably not to be explained merely by saying that one type of case was more common during certain months. Our results rather point to an explanation based on the time elapsing from the onset of illness till the first agglutination. The nearer to the onset that the first agglutination is made the greater will be the number of positive A agglutinations. The further on in convalescence one goes before taking a reading the more likely is it that the less persistent A agglutinins will have disappeared, and consequently there will be a greater apparent percentage of B infections.

11. We are unable to furnish any clear evidence of co-agglutination of A for B or *vice versa*, and there is no evidence of B. typhosus evoking co-agglutinins for paratyphoid organisms in the lowest dilution we employed—viz., 1 in 27. Paratyphoid infections in persons inoculated against typhoid have acted as a stimulus to the agglutinin-forming mechanism which had previously been called into being by a preventive T. inoculation.

12. We desire to emphasise the need for repeated agglutinations at intervals in the case at least of persons previously inoculated. We do not think that any diagnostic inference can be drawn from a consideration of the titre in inoculated persons, where only one examination has been made, as individuals vary so diversely in their agglutinin response to infection or inoculation.

13. We have found no evidence to support the view advanced by Tidy that marked pyrexia for some days is associated with diminution or disappearance of T. inoculation agglutinins. Diagnosis on Tidy's assumption would be more misleading even than that based on clinical observation alone.

14. The civilian epidemic in Reading was not due to B. typhosus alone, but was complicated by a paratyphoid infection in a certain proportion of the cases. The source of infection here was probably a military one, and the small epidemic broke out at a time when large numbers of typhoid and paratyphoid cases were in the military hospitals.

15. None of the 38 uninoculated controls showed any trace of agglutinins for T., A or B, except 4. In one of these there was a definite history of contact and in another a strong probability. Two only could not be accounted for.

References.—1. E. Hort: Brit. Med. Jour., 1915, vol. ii., p. 892. 2. E. Glynn and E. C Lowe: THE LANCET, 1916, vol. ii., p. 222, et seq. 3. H. L. Tidy: THE LANCET, vol. i., 1916, p. 241.

AN APPLICATION OF DROP-MEASURING TO WIDAL TECHNIQUE:

A REPLY TO ADVERSE CRITICISM.

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IN a recent article by R. Donald on a Method of Drop-measuring Liquids and Suspensions[1] the writer finds occasion to make certain unfavourable criticisms of the drop-method and apparatus recommended for use with the standardised agglutinable cultures issued from the Standards Laboratory of the Department of Pathology at Oxford on behalf of the Medical Research Committee. The fact that the author of the article has for several years been engaged in a series of very detailed and extended researches on drop-measuring lends evident importance to his statements on this subject, though it does not qualify him to assume that the physical principles underlying such methods of measurement, which, as he rightly says, "have been more or less widely known for generations," are unfamiliar to other workers who have employed drop-measurement for many years past.

In associating with the publication of his article the name of Professor W. Bulloch, F.R.S., the writer adds greatly to the apparent weight and value of his criticisms of Dreyer's method of measuring the agglutinin reaction for purposes of clinical pathology. Nevertheless, it can be demonstrated without difficulty that those of his objections whose triviality is not transparent entirely fail to establish themselves in regard to any essential detail of the method in question. Yet since the author appears to put forward all his objections with equal seriousness, it might seem discourteous not to make some attempt to meet them *seriatim* and with suitable gravity.

The misleading character of the statements which form the foundation of this very vigorous criticism has already been indicated briefly on a former occasion.[2] But, in the absence of my friend and colleague, Major G. Dreyer, on active service, I may now be permitted to undertake the duty of defending in more detail his agglutination technique against aspersions which I venture to think disfigure a contribution possessing otherwise no little interest. Unfortunately, it is often found to be the case that when such aspersions prove to be ill-founded and to spring from hasty judgment or inaccurate deduction, they tend to create a feeling of dubiety regarding the value of other and doubtless unexceptionable conclusions which the writer has put forward.

Donald's criticisms are directed chiefly against: (*a*) the pipettes provided in the agglutination sets supplied for the Medical Research Committee, because he finds considerable variation in the volume of their drop-delivery; (*b*) the technique, because it seems on cursory examination to disregard the fact that drops of different fluids and suspensions are of different volumes. On the former count he credits the method with an error of 40 per cent., and on the latter he awards it errors of 20 per cent. and 10 per cent. respectively. Further (*c*) he animadverts on the "Directions" for the "Use of Standardised Agglutinable Cultures" both for things they say and for things they omit to say, as well as for their general neglect of "the six precautions" which he mentions as being "necessary for practical accuracy in drop-measuring."

These are very serious and sweeping charges which can hardly have been read with equanimity by any who have committed themselves during the past year or more to the use of Dreyer's method. Since if they were well established it would be evident that this method entailed inaccuracies almost approaching the same order of magnitude as those inherent in the older methods of performing agglutination tests. The appearance of accuracy obtained by standardising both the opacity and the sensitiveness to agglutination of the cultures issued would then be quite illusory. For the quantitative measure which it was hoped thus to obtain would vanish in a mass of incorrigible errors from other sources. Fortunately this is not in any degree the case, as I shall try to show. But first it may be of assistance in clearing the ground to state briefly (α) what in essence Dreyer's method is, and (β) what it attempts to do.

α. The essence of Dreyer's method consists in having so arranged the details of the technique that in any given agglutination test the serum acts throughout in all its dilutions in the same volume of fluid, and on the same number of bacilli, in a suspension whose sensitiveness to agglutination has been ascertained exactly, instead of acting in unequal volumes of fluid as is frequently the case, on unequal numbers of bacilli as is usually the case, and in suspensions of unknown and highly variable sensitiveness to agglutination as is always the case in other methods which were previously in use. The method also endeavours to ensure that the actual volume of the mixture of the fluids used shall, so far as possible, always be approximately the same in every test that is made, and shall be contained in tubes of approximately the same form and diameter. But these matters are not regarded as being quite so fundamental since, so long as the *ratios* of the fluids remain unaltered, such differences in the results as may occur from failure in these details are so small that they can only be detected with difficulty, if at all.

β. What the method attempts, and not unsuccessfully, is to provide a means of performing agglutination tests of such precision as will enable a diagnosis to be made even in inoculated persons; and this not only where well-equipped laboratories are at hand, but without any laboratory at all, or any other apparatus than that provided, and under all the various difficulties of active service conditions.

[1] THE LANCET, Sept. 2nd, 1916, p. 423.

[2] THE LANCET, Sept. 9th, 1916, p. 493.

The "Directions" issued with the agglutination sets and the agglutinable cultures attempt to set forth in plain and simple language exactly what has to be done in putting up a test, and they avoid all unnecessary and complicated explanations or theoretical discussions. Since it is probably more useful as a practical measure to remove the difficulties and pit-falls in advance than to attempt a learned exposition of their nature. It may be added incidentally that a wider introduction of a method which has been available for use (and has been used by us and others) for ten or a dozen years places one of the most important methods of serum-diagnosis at the disposal, as it ought to be, of every medical practitioner for his personal use. He is thus now enabled, if he wishes, readily to make his own agglutination tests, and to arrive without difficulty at a serum-diagnosis, at any rate in non-inoculated persons. The *arcana* of the pathological laboratory are not seriously infringed, and the pathologist, labouring to elucidate obscurer problems in the advancement of our science, is so far freed from the exacting and unstimulating task of coping with an ever-growing burden of routine work. We are now in a position to understand the general aims and character of the method which is so severely criticised, and to examine in their due relation the leading features of the criticism to which it has been subjected.

(*a*) *The pipettes.*—1. The first comment made on the pipettes by Donald is entirely just, though the conclusions which he draws from it do not therefore necessarily follow. The pipettes, and particularly their nozzles—the important part—are not at present made so well as they should be. They are not accurately to gauge; nor are the little tubes, as he might have added. Before the war one could get these things to gauge at moderate cost, and one hopes to have them so again in the course of time. Constant efforts have been made in this direction in order to get rid of the *small* difference which these irregularities in pipette-drop-delivery and tube-size may produce. But these differences are, as already stated, not of such a character or magnitude as anyone using the ordinary series of dilutions is likely to note, and they certainly are not such as can affect materially either the diagnostic or the comparative value of the results obtained. The ratio of the several fluids used remains unaltered, and while we regret these irregularities in manufacture and desiderate their speedy removal, we deny that they have any important bearing, except as a possible source of inconvenience as, for example, from over-filling of the tubes.

In view of the existing lack of uniformity in the volume of the drop-delivery of these pipettes a proposal by Donald, directed primarily to correcting for drop-size in the different fluids, is not without humour. This is that three pipettes should be employed each of given and very accurately determined drop-delivery. Now for the purposes of distribution on quite an extensive scale, as in the present connexion, each of these pipettes would, like our own, need to be made commercially and at small cost. And each would be liable to the same kind of irregularity in manufacture as our own pipette. We should thus secure three errors instead of one. And not only so, but any error in any one of these pipettes would, unlike an error in our own, produce an actual and serious error in the technique, since every error in Donald's pipettes would affect the *ratio* of the different fluids used in putting up the test. This seems to offer an insufficient inducement to accept the proposal. Or does Donald intend to limit the performance of agglutination tests to those trained workers in equipped laboratories who have the necessary opportunity and skill to make and calibrate their own pipettes? If so, the answer is that we prefer a method that is universally available and that requires no special skill in manipulation.

It is not always easy for a skilled laboratory worker to realise the degree of training needed to make use of apparatus and manipulations which he himself has come to regard as simple, otherwise Donald might have hesitated to conclude that his proposal for the use of several accurately calibrated pipettes would facilitate the general performance of reliable agglutination tests. Incidentally, it may be noted that he rather unfairly and persistently refers to our pipette as a "standard" pipette. This it makes no pretence to be; nor has it ever been called so either in the Memorandum of the Medical Research Committee, in the Directions, or in other writings. No one would expect to get even one pipette to which the term "standard" could be applied in any ordinary sense for the price of this whole set of agglutination apparatus. But the application of the term, however innocently, is likely to convey a wrong impression.

2. The drops of different fluids delivered by any given pipette are of different sizes, and Donald discovers what he calls a culture-pipette error in Dreyer's technique amounting to 40 per cent. by supposing that the worker possesses two Dreyer pipettes differing as greatly in size as two which he himself was unfortunate enough to meet with, and uses the larger one for measuring the fluid whose drops are already relatively too large and the smaller one for the fluid whose drops are relatively small. This error is entirely manufactured *ad hoc*. It is fabricated—with what object others must judge, but I cannot credit the more obvious interpretations. At any rate, it has nothing whatever to do with Dreyer's technique or with the "Directions," since it is clearly, if only implicitly, laid down in the "Directions" that one and the same pipette shall be used throughout in putting up an agglutinin test; for at the end of each stage in the procedure it is directed that *the* pipette in use shall be washed and dried, and so carried on to the next series of drop-measurements.

3. That this point was quite clearly apprehended by Donald appears from the fact that on one occasion he definitely states it to be so, thus: "If the same pipette were used throughout the measuring, as is implied in the Directions." On another occasion he reflects unfavourably upon this washing out and drying of *the* pipette as "a precaution so expensive of time and of materials." The discovery of this 40 per cent. error is therefore altogether a very odd affair.

In his own procedure, which he seems to consider free from any similar waste of time and materials, three pipettes are employed in succession, and since we must hope that they would be washed out and dried before being used to put up another test the saving of time and materials is not readily detected.

(*b*) *Drops of different fluids are of different sizes.* On this count Donald finds two more errors in Dreyer's method, one of 10 per cent. and one of 20 per cent. The point is easily dealt with. Donald tells us that 10 drops of water have the same volume as 11 drops of serum or 12 drops of standardised agglutinable culture. And he proposes to avoid errors in drop-measurement from this cause and get over this difficulty by making the worker use three different pipettes accurately calibrated for the three different fluids, and instructing him how to make necessary allowances and calculations. The "Directions" get over the same difficulty by deliberately saying nothing about it. This is not excusable on a plea of ignorance, for we knew of the existence of these errors. But it happens that they work in opposite directions and very largely counterbalance each other. They thus leave as residue a small ascertainable and uniform error in the "reputed" dilution of the serum, and in nothing else. This statement may be further explained as follows. Consider the series of dilutions 1 in 25, 1 in 50, 1 in 125, 1 in 500 which the "Directions" instruct the worker to put up for his first determination. The "Directions" speak of making a serum dilution of 1 in 10 to begin with, and direct that 60 drops of it shall be prepared (6 of serum and 54 of water or normal saline solution). This is in reality, as Donald shows, a 1 in 11 dilution of the serum. But this dilution (and all higher dilutions of serum, if such be subsequently required) can be regarded as having the same drop-volume as water or normal saline solution—correct to about two places of decimals.

The worker now fills in his tubes with a series of drops of water, dilute serum, and standardised agglutinable cultures on the scale given below in such a way that each tube finally contains 10 drops of water plus serum, and 15 drops of standardised agglutinable culture:—

	Tube—				
	1	2	3	4	5
Drops of water (or saline) ...	0	5	8	9	10
Drops of serum dilution ...	10	5	2	1	0
	10	10	10	10	10
Drops of standardised agglutinable culture	15	15	15	15	15

But in all the tubes the serum is weaker than its reputed strength as 10 is to 11. And in all of them the 15 drops of culture have only the volume of 12 drops of water, the total volume in each tube being thus the equivalent of 22 drops of

water instead of, as reputed, 25. Let us therefore call them all 22 drops. Now the quantities of serum actually present in the tubes are in volumes respectively 10/11, 5/11. 2/11, 1/11, and 0 of a water-drop. And 10/11 of a drop in 22 drops is precisely 1 in 24·2 instead of the reputed 1 in 25. Similarly for the other tubes, each of which also possesses an error of about 3 per cent. in the reputed dilution of the serum. The worker has actually put up dilutions of 1 in 24·2, 1 in 48 4, &c., but has been deluded into calling them 1 in 25, 1 in 50, &c. Of what conceivable importance can this be when in the course of active enteric infection we are dealing with changes of titre in the serum amounting to anything from some hundreds per cent. up to thousands per cent. ?

Thus far we have succeeded in reducing alleged errors (in technique), which if cumulative amount to 70 per cent., to a single error (in nomenclature) of about 3 per cent.

(*c*) The "Directions" make no adequate reference to any of Donald's "six precautions," nor indeed to any other precautions we have taken in connexion with this matter. To point this out is rather a compliment than a criticism when viewed in the proper light, though apparently it was not so intended. But on this occasion we may briefly consider some of these precautions.

1. The outer diameter of the pipette nozzle. The great importance of variations in this measurement and the relative unimportance of the inner diameter were fully recognised. Close gauges for the outer diameter of the nozzle were provided from the first. In view of what has already been said about the manufacture of the pipettes the matter may be left there for the moment.

2. The practical vertical position of the pipette nozzle. If there is any reason to believe that the pipette is not held vertically (or nearly so) by the worker, Donald performs a service in drawing attention to the omission of instruction on this point. It did not seem probable to us that anyone would be likely to attempt to fill in drops from a teat pipette into very narrow tubes placed in rows in a stand except with the pipette held vertically or nearly so. After watching many successive classes of students learn the method I should not have thought the danger very great. Certainly the vertical position is the usual one and the natural one, and something must always be left to the intelligence of the operator. Moreover, whatever position the worker adopts, he is likely always to assume pretty much the same position, so that his drops will all have similar errors. Still the lack of reference to the position of the pipette is a distinct omission which can easily be remedied, and thanks are due to Donald for calling attention to it. Unfortunately, the rest of his criticisms are not of the same value, and some of them are merely trivial.

3. He disapproves of hand-pipettes with teats because the drop-size varies somewhat with drop-rate. By using wide differences in drop-rate—namely, from 1·3 seconds to 10 seconds per drop (nearly an eight-fold increase in drop-time)—he obtains a difference in drop-size of just over 5 per cent. His lower limit of time is quite excessive for this kind of drop-measurement. But even from his own figures one might safely have hazarded the opinion that any differences in drop-time likely to be present when a worker is filling in tubes "by gentle pressure on the teat" of a properly handled pipette in the earnest pursuit of his routine work are unlikely to amount to 1 per cent. And we should willingly have presented Donald with a 1 per cent. error here did we not happen, as a matter of fact, to know from many trials that with a Dreyer pipette the drop-rate error does not nearly reach this figure.

4. The temperature. We are charged with ignoring in the present technique the effect of temperature on drop-measurement. The charge is perfectly well founded, as would also be a charge that we wilfully ignore the effect of differences in the barometric pressure and in the relative humidity of the atmosphere, and give no correction for the variation in the force of gravitation at different points on the surface of the globe, though all these phenomena have *some* effect on our operations. It is simply a question of order of magnitude. As regards the temperature, each rise of 1° C. in temperature lowers the surface tension of water about ¼ per cent., and consequently also lowers the drop-volume. Thus, a difference of temperature of 8° C. (14° to 15° F.) will make a difference of 2 per cent. in the drop-volume of water. But Donald forgets to point out that the drop-volume of serum and of the standardised agglutinable cultures are altered at the same time in the same direction, so that their *ratios* can only be affected to an entirely insignificant extent per 1° C. It follows that unless the worker has it in mind to carry out his manipulations in a refrigerator or in a Turkish bath—and for this we have failed to provide—the factor of temperature is entirely negligible.

It would be tedious, and I think unnecessary, to pursue this discussion further. I have attempted to show that the whole framework of the criticism put forward by Donald rests on a totally inadequate foundation, and that he was misled in supposing himself to have discovered errors of such gravity in Dreyer's method that it became a "public duty" to point out its inaccuracy.

It was *a priori* unlikely that a responsible and authoritative body like the Medical Research Committee would have undertaken the issue of standardised agglutinable cultures, and strongly supported the use of the technique in question by supplying the agglutination sets so widely as they have done had the method been ill-devised, inaccurate, and slip-shod.

It appears, on the contrary, that the most recent scrutiny, and one conducted by an expert in drop-measurement, has failed to prove it open to serious criticism in any significant detail. It is the objections offered which are seen to be ill-founded. But though it is proper that inaccurate criticism should be firmly rebutted, it must not be supposed that anything said here in meeting Donald's objections is meant to throw doubt on the sincerity of his intentions. It was unfortunate that he failed to explain more clearly that the supposed error of 40 per cent. was not only entirely factitious, but also one already carefully precluded. It was still more unfortunate that such unsubstantial criticisms should appear under the name and ægis of an important institute.

A NEW REMEDY FOR SYPHILIS, LUARGOL OR "102."

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SINCE the introduction of salvarsan, several substitutes have been put on the market. In 1913, Mouneyrat in France discovered galyl or tetraoxydiphosphotetraminodiarsenobenzol. He added two phosphoric groups to arsenobenzol, and made a compound more powerful in arsenic than neosalvarsan. Dr. Danysz, of the Institut Pasteur in Paris, who has been working for a long time on the treatment of trypanosomiasis, introduced two years ago a new compound as a substitute for salvarsan called "102," or luargol, in which he added silver salts and antimony to arsenobenzol.

The antiseptic properties of silver are well known. For many years the silver nitrate pencil has been used as caustic and for treating syphilitic mucous plaques. These properties have again proved their value when colloidal silver preparations were used as ointments or intravenous injections in septic conditions. Charcot has shown the perfect tolerance of silver, and that poisonous symptoms appeared only after absorption of 30 grammes of silver nitrate. Danysz at first tried solutions of silver nitrate. He noticed that at the 1 in 80,000 strength this solution had not a great microbicidal action, and had the grave disadvantage of causing venous thrombosis. He then combined silver with eosin, and obtained a precipitate which dissolved by adding sodium chloride. This product proved to have a powerful anti-syphilitic action in experimental treatment on rabbits. But the veins were still considerably altered by this product, which could not be used at all in therapy.

After further research, Danysz tried to combine silver with dioxydiaminoarsenobenzol, and obtained another compound. A solution of silver nitrate was mixed with an aqueous solution of dioxydiaminoarsenobenzol hydrochloride. A more or less brown clear solution, varying with the quantity of silver used, was obtained. By adding to this sodium chloride, a flocculent precipitate was formed and no modification appeared in the liquid. This precipitate treated with sulphuric acid gave another abundant pale-yellow precipitate and the liquid contained only traces of arsenic and silver, which demonstrated that silver and chlorine had been fixed by dioxydiaminobenzol. Danysz had then the idea of replacing chlorine, which is without any therapeutic property, by bromine or iodine, which have

microbicidal properties. He obtained thus a bromo-silver arsenobenzol, which he called the "88" 2. This product was very satisfactory and experience proved its efficiency. Hoping further to increase the specific action, Danysz tried to introduce in this "88" 2 a certain quantity of antimony as trichloride of antimony ($SbCl_3$). He then obtained a dioxydiaminoarsenobenzolstibicosilver sulphate, whose formula is: $(C_{12}H_{12}O_2N_2As_2)2AgBrSbO(H_2SO_4)_2$, and which Danysz called luargol, or "102." In analysis the following is found:—

C	19·88 per cent.	As	20·70 per cent.
Ag	7·45 ,,	Sb	8·29 ,,
Br	5·52 ,,	S	8·86 ,,

Silver is fixed in this compound as a bromide, antimony as antimonyl. The addition of a silver salt increases the antiseptic properties of arsenobenzol. Bromide has been chosen because experience proved that the combinations with silver bromide are more active than those made with chloride or nitrate and less toxic than those with silver iodide. The addition of antimony seemed indicated in those cases of syphilis and trypanosomiasis in which arsenic had no effect at all, and in which antimony proved very efficacious.

Danysz's experience shows that the "102" is more active than any other arsenical compound in trypanosomiasis. For instance, in rabbits infected with surra, the evolution of the disease is about the same as in trypanosoma infections in man. After an incubation period from 5 to 7 days, there are raised temperature and wasting. Thirty to fifty days following inoculation lesions appear on the skin and mucous membranes; later there are nervous troubles. If treatment is begun during the incubation period all arsenical compounds cure the animals easily. If treatment starts during the second period, atoxyl, arsenophenylglycine and arsenobenzol give only a certain proportion of cures, while "88" 2 and "102" cure them all. During the last period, when lesions have appeared, "102" alone could cure nearly all animals (5 in 6) with doses of 0·01 cg. per kilogramme. For obtaining the same result with "88" 2 twice as much had to be given. Other arsenical compounds at the same doses gave no result at all. Thus, the relation between the tolerated dose and the curative dose of luargol is 80 to 1, for trypanosoma gambiense 100 to 1, while for the same trypanosomiasis, the relation for atoxyl is 4 to 3, arsenobenzol 10 to 1, arsenophenylglycine 3 to 1.

In sleeping sickness luargol is 75 times more active than atoxyl; 30 times more active than arsenophenylglycine and 10 times more active than arsenobenzol. Experience has shown also that luargol cured mice infected with Trypanosoma dimorphon which is known to be resistant to arsenobenzol, atoxyl and phenylglycine. In rabbits the treponemata in the chancre disappear in 24 hours with doses of 0·002 to 0·003 gm. of luargol per kilogramme. The same result is obtained in men after a single injection of 0·10 or 0·15 gm. The same, of course, is seen with arsenobenzol, but with much larger doses. Luargol can thus be used in cases where arsenobenzol is not tolerated.

Luargol is interesting as a new substitute for salvarsan because the effective therapeutic dose is far off the toxic dose as compared with other arsenical compounds. Very small doses need to be injected for obtaining a therapeutic effect. With doses of 0·10 or even 0·05 gm. the therapeutic effect is already evident, while the toxicity is about 0·20 gm. per kilogramme in rabbits. The injections are given intravenously in the same manner as employed in salvarsan or neosalvarsan. They are repeated every second or third day, the first dose to be injected being 0·10 or 0 15 gm. The following doses are increased up to 0·30 or 0·35 gm. The total dose of 1·0 to 1·20 or perhaps 1·50 gm. ought to be injected in 6 or 7 injections.

After the first injection, there is often a febrile reaction more or less intense which is never serious and disappears in a few hours without any serious vomiting, headache, or gastro-intestinal troubles. Generally, the further injections give rise to no reaction. The slight reaction after the first injection is probably due to the destruction of the spirochætes. The intensity depends upon the general state of the patient and is variable. In strong subjects in good condition, there is very often no reaction at all. In three cases out of 500 treated with luargol at the Hôpital Cochin, in Paris, on the day following the first injection, there was a general scarlatiniform rash with a moderate temperature. This rash disappeared in two days without any further trouble. This is the only unusual incident registered up to the present time.

The immediate therapeutic effects of luargol are about the same as those obtained with arsenobenzol with doses three times as strong. The primary, secondary, and even the tertiary symptoms yield in a few days with doses of luargol always much smaller than those which would be required with salvarsan, neosalvarsan, or any other substitute. In 80 per cent. of the cases treated the Wassermann test gave a negative result one month after the beginning of the treatment, and after 1·0 to 1·20 gm. had been injected. But here, as in the treatment with salvarsan, the Wassermann test can give again a positive result after a few months. Another course of injections may then become necessary. All these cases have been treated without mercury or local treatment. In every case luargol has proved to be a powerful tonic, the general state of patients improving quickly. Luargol is very stable and keeps in solution without alteration for many hours. A great number of patients can be injected with the solution. The treatment seems to be without any danger in ordinary cases. The results are very rapid, as the injections can be repeated every second or third day.

Luargol is a light yellow-orange powder insoluble in water. It is soluble in a solution of sodium hydrate, 0·40 cg. of the latter being able to neutralise 1 gm. of luargol. Practically the best way to proceed to get the solution is to dissolve 1 gm. of the powder in 15 c.c of a 4 per cent. solution of sodium hydrate. The powder dissolves quickly, and a dark-brown, nearly black, thick solution is obtained. The injections can be made by the syringe with concentrated solutions, in the same way as with neosalvarsan by Ravault's method; in this case a 1 per cent. solution is prepared by adding distilled water up to 100 c.c., each c.c. containing 0 01 gm. of luargol. If the glass-tubing apparatus is preferred, the solution must be 1 per 1000, and made by adding normal saline up to 1000 c.c. Each 10 c.c. will contain 0·01 gm. of the drug. In both cases the solution is filtered. This way of proceeding is very convenient for hospitals where a great number of injections are made at the same time. The preparation is supplied in sealed tubes containing 1 gm. for hospital purposes, or in five different strengths—viz., 0·10, 0·15, 0·20, 0·25, 0·30 gm. Complete outfits with a phial of the alkaline solution, a filter, &c., with full instructions for use, are supplied also for private cases.

Posology of "102."—In acquired syphilis with primary, secondary, or tertiary symptoms without nervous complications, the following doses should be injected in a normal adult patient:—0·15, 0·20, 0·25, 0·30, 0·30, 0·30 gm., i.e. totally 1 50 gm. in six injections repeated every second, third, or fourth day. For a female patient in the same condition the following doses: 0·10, 0·15, 0·20, 0·25, 0 25, 0·25 gm., i.e. totally 1·20 gm. In cases with nervous or any other complications the treatment should be carried on with quite small doses increased very slowly, if the first dose is well tolerated. The injections are made into the veins exactly in the same manner as is employed with any other drugs. If a concentrated solution is used with the syringe, the injection is to be made very slowly into the vein, especially with doses over 0 15 gm. No food should be taken for four hours previous to the injection. The patient must rest for a few hours afterwards. He can have a cup of tea, but no food is to be allowed until four or five hours after the injection, when a light meal may be taken. It is better to make the injection about 5 or 6 P.M., as then the patient can rest until the following morning.

Contra-indications.—The contra-indications for luargol are the same as for other arsenical compounds, i.e. asystoly, uræmia, and a cachectic state not due to syphilis. In badly compensated heart disease and in syphilitic affections running an acute evolution, such as acute meningitis, nephritis, jaundice, &c., the increasing doses should be very small, 0·006 to 0 003 gm. There are very few absolute contra-indications, as luargol is always well tolerated and seems to be harmless in uncomplicated cases.

Clinical results.—During the past six months, through the courtesy of Mr. A. Shillitoe and Mr. C. Gibbs, of the honorary staff of the Lock Hospital, I have treated about 100 cases of syphilis at different stages with luargol. A certain number of cases have been treated as out-patients at the French Hospital. All these cases, without exception, have done well and the results are most satisfactory. The therapeutic effects have

been more rapid than with salvarsan, neosalvarsan, galyl, novarsenobenzol, or neokharsivan in every case. No serious complications or reactions have been observed. All symptoms of the disease have cleared up rapidly. The injections have been made with concentrated solutions of "102" by means of a 20 c.c. glass syringe. All out-patients have been treated in the consulting-room and have left directly afterwards. In some cases they did not even strictly follow the instructions given, but no harm appears to have resulted. In the wards of the Lock Hospital the patients were not kept in bed after being injected. Frequent small doses have proved to be of greater benefit and to give better results than larger doses at longer intervals. Luargol alone has been given in every case and no local treatment made. The cases herein reported are chosen at random and contain only clinical results.

CASE 1.—The patient, a young man aged 23, had been exposed to infection at the beginning of February, 1916. Came under treatment on March 1st with a typical syphilitic chancre on the penis: dirty greyish sore with indurated base. Glands in both groins much enlarged; Wassermann test positive.

Treatment.—March 4th: Chancre the size of a shilling-piece, with indurated base and much swelling of prepuce. A dose of 0·10 gm. of luargol was given intravenously; no reaction followed. March 7th: Third day. Swelling of prepuce had gone down; chancre red and clean; epidermisation beginning on the edges. Second dose of 0·20 gm. was given; no reaction followed. March 11th: Seventh day. Chancre healing; induration of base nearly disappeared; a small area only not epidermised. Patient feels much better. Third injection of 0·25 gm. was given; no reaction followed. March 14th: Tenth day. Chancre quite healed; induration of base gone; glands in groins much smaller. Patient feels very well. Four further doses of luargol of 0·25 gm. were given at regular intervals to complete the treatment.

In this case the chancre was healed in ten days after injecting a total dose of 0·55 gm. Up to the present time (August 28th, 1916) the patient, whom I see regularly, has not developed any secondary symptoms. No local treatment was done and no mercury was given.

CASE 2.—The patient, a man aged 32, had been exposed to infection in January, 1916. A syphilitic chancre developed 25 days later. He was treated privately with medicine and applications of boric vaseline without amelioration. Came under my treatment on March 1st. The patient was feeling very ill, giddy, and weak. He complained of headache. Large dirty greyish discharging sore on penis with indurated base, the width of a two-shilling piece; much swelling of prepuce. Glands much enlarged in both groins. Maculo-papular rash on chest, back, and limbs. Sore throat, tonsils enlarged, inflamed with white patches. Mucous plaque on under lip. Swallowing difficult and painful. Wassermann reaction positive.

Treatment.—March 1st: Luargol 0·15 gm. injected; slight reaction followed; temperature 101° F. for two hours. March 4th: Third day. Swelling of prepuce had diminished; chancre looked clean and red; on the edges epidermisation could be seen starting. Throat better; the white patches had gone, tonsils less inflamed, swallowing easier; headache the same. Second injection of 0·25 gm. given; no reaction followed. March 7th: Seventh day. Chancre healing, level with the skin, about half its previous size; induration softer and going down; swelling of prepuce gone. Glands in groins smaller, rash fading and disappearing. Throat much better, tonsils smaller, swallowing quite comfortable without any more pain. Patient felt strong and "fit"; headache very slight. Third dose of 0·25 gm.; no reaction followed. March 11th: Eleventh day. Only a very small area of the chancre had not healed; induration of base had gone. Glands in groins smaller. Throat quite well. Rash had cleared up, only a few fading spots could still be seen. No further headache. Fourth injection of 0·30 gm. of luargol given; no reaction afterwards. March 14th: Fourteenth day. Chancre quite healed, flat with the skin. Rash quite cleared. Glands in groins getting smaller. General state of patient very good. Two further injections of 0·30 gm. were given to complete treatment up to 1·55 gm. of luargol. June 1st: Seen again; patient quite well; no other symptoms had developed.

CASE 3.—The patient, a girl aged 18, was admitted into hospital with a large typical syphilitic chancre on fourchette, the size of a shilling-piece, with a dirty greyish discharging base. Tissue all around infiltrated, and huge swelling of labia. She felt weak, giddy, depressed; general state bad. Glands in both groins enlarged and Wassermann reaction positive.

Treatment.—First day: Intravenous injection of concentrated solution of "102" by means of syringe; 0·10 gm. given at 10 A.M.; slight reaction. Temperature at 6 P.M. 101° F., no sickness or headache. At 8 P.M. temperature 100°; at 10 P.M. normal; no rise afterwards. Fourth day: Swelling of labia greatly diminished. Chancre smaller, red and healthy; epidermisation seen growing from the edges. Second injection of 0·15 gm.; no reaction afterwards. Fifth day: Swelling gone; chancre half its previous size. Patient feeling stronger and better. Sixth day: Chancre healing quickly; infiltration of base nearly gone; glands in groins smaller. Seventh day: Chancre nearly healed; only a small area not epidermised; sore flat with the skin; infiltration of base gone. Third injection of 0·20 gm.; no reaction afterwards. Ninth day: Chancre healed; glands smaller; patient feeling very well. Three further injections of 0·25 gm. at regular intervals up to the total dose of 1·20 gm. luargol was given; no reaction followed the injections.

CASE 5.—The patient, a woman aged 42, had the first symptoms of syphilis seven years ago; was treated privately with medicine and pills. When admitted into hospital for treatment there were several mucous tubercles of different sizes on vulva, and a large ulceration, the size of a two-shilling piece, stretching from right labia to fourchette; base indurated and infiltrated. Both labia much swollen. Glands in groins hard and enlarged, glands in neck. Ulceration, the size of threepenny-piece, on the nose. Throat very sore for last three weeks; tonsils much enlarged and inflamed with ulcerated white patches; swallowing difficult and painful. Six gummata discharging pus, on scalp, the size varying from a sixpenny to a shilling piece. General state of patient very bad. She complained of headache, weakness, giddiness, with pains in the bones; Wassermann reaction positive.

Treatment.—First day: Intravenous injection of concentrated solution of "102" at 10 A.M. by means of syringe; dose, 0·10 gm. At 2 P.M. temperature normal; at 4 P.M. 99° F., headache, slight sickness. At 6 P.M. temperature 100·2°; headache the same, sickness worse. At 8 P.M. temperature 99·1°, headache the same, sickness better; at 10 P.M. temperature normal, slight sickness, headache continuing. Fairly good night; following morning head still aching, this continuing for about 24 hours. Third day: Swelling of vulva much diminished. Mucous tubercles softer; ulceration on vulva much better, looked clean and healthy. Ulceration on nose quite red and cleaner; gummata the same. Throat: tonsils less inflamed; swallowing not so painful; white patches on tonsils better. Second injection of 0·15 gm.; no reaction followed but a worse headache than usual for 24 hours. Fifth day: No swelling on vulva. Hard base of ulceration much softer. Ulceration healing; epidermisation could be seen growing from edges of sore. Ulceration of nose quite healed, flat with the skin. Mucous tubercles on vulva smaller. Gummata on scalp no longer discharging pus, looked clean and healthy. Throat much better; white ulcerated patches gone, tonsils smaller, swallowing not painful. Patient feeling stronger and better altogether. Third injection of 0·20 gm.; no reaction followed. Eighth day: Ulceration of vulva nearly healed, flat with skin; only a small area not epidermised. Mucous tubercles quite small and flat. Throat quite well, swallowing quite normal. Gummata on scalp getting smaller; quite dry, practically healed. Glands in groins and neck getting smaller still, and less hard. Patient quite well and gaining in weight. No headache. Fourth injection of 0·25 gm.; no reaction followed. Twelfth day: Scalp quite healed; glands still smaller. Patient quite well, wanted her discharge. Two further injections at regular intervals were given to complete treatment up to the total dose of 1·20 gm. of luargol.

I have notes of one case with large papular syphilides of the face, arms, and legs, lesions which are most resistant to genuine German salvarsan. This case was treated with another arsenical substitute without improvement. I commenced treatment with luargol, after a complete course of injections of another substitute had failed to improve the condition. After four injections of 0·10 gm. every second day the lesions began to clear up and proceeded to improve until the twentieth day, when they had completely disappeared. The injections were increased at regular intervals till the total dose of 1·50 gm. was given to complete treatment.

Another case with hard pigmented papular general rash, lesions which take weeks and weeks to disappear with salvarsan, was also treated with another substitute without improvement at all. This case was put under luargol. One week after the beginning of the treatment the papules began to shrink and to flatten. Fifteen days afterwards most of them were flat with the skin and fading. In the third week all papules were quite flat and some quite faded. In several other cases all the symptoms cleared up after a single dose of 0·15 gm. of luargol, but it must be remembered that very often slight syphilitic symptoms

disappear without any treatment at all. In other cases, after a dose of 0·05 gm. only, epidermisation began very quickly to grow from the edges of long-standing sores. I have received during the last month from several medical men who are using luargol in London, letters telling me that after injections of this remedy they met sometimes with very bad general reactions or with thrombosis or phlebitis of the veins. In the hundred cases treated here up to the present time, slight thrombosis followed the injections in four cases and this was due to the using of impure hydrate of sodium. Only chemically pure sodium should be used to dissolve luargol, otherwise, if there is a too large proportion of carbonate in the alkaline solution, luargol is converted into an insoluble black sediment of carbonate which on no account should be injected. If the proper solution of soda is employed, luargol gives a perfectly clear brown-black solution which hardly needs filtering, and no trouble whatever should follow the intravenous injection.

It is of the greatest importance that injections should not be made until the operator is assured his needle is in the vein. If in spite of this there is thrombosis the fact is due to an excess of soda in the alkaline solution. But I must add that thrombosis of the veins may occur with any other drug if, when injected into the vein, the solution is not isotonic. With each outfit of luargol a phial containing the correct diluted alkaline solution for the dose wanted is provided, and thus the risks of thrombosis are reduced to a minimum. In order to avoid this inconvenience Danysz has prepared lately a new preparation of this remedy, the sodic luargol, which dissolves simply in distilled water like neosalvarsan. I have used it now for two months with great satisfaction. This preparation is very handy, less toxic, and the efficacy as regards clinical results is exactly the same. It is not yet on the market, but will be provided in sealed tubes of 0·10, 0·20, 0·30, 0·40, and 0·50 gm. The solution is filtered before use for safety, and injected as before explained.

Regarding severe general reactions which may follow the intravenous injection, I had one case only. It was that of a girl of 24 years who had had three injections of luargol before, without any reaction afterwards. She got her fourth injection at the same time and with the same solution as 20 other patients. Alone, of these 20 cases, she complained, directly after the injection was made, of severe pains in the arm. There were congestion of the face, slight dyspnœa; she had a very high temperature up to 104° three hours afterwards, with vomiting and headache. These symptoms lasted for 24 hours and the patient was quite well again and later had two more injections without any reaction afterwards.

Danysz showed that after intravenous injection of a product of the dioxydiaminoarsenobenzol group, symptoms of poisoning of very alarming aspect are sometimes observed; congestion of the face, dyspnœa, urticaria, trembling and contraction or weakness of the limbs, convulsions, headaches, accompanied or not by temperatures of 102°, 104°, and even 105°.

Struck by the resemblance of some of these symptoms to those of nitrite poisoning, M. Milian has given them the name of "nitritoid crises," and it is under this name that these accidents have since been generally described. These troubles always appear during or immediately after the injection, and no apparent symptom enables the practitioner to foresee the possibility of such an accident, generally more alarming than grave, which may arise in the case of individuals of the best constitution having all organs in perfect condition. Again, a nitritoid crisis may be observed in the case of one or two patients out of 10 or 15 who have received injections at the same time of the same product, prepared for all of them and taken from the same vessel; or the crisis may appear in the case of a patient who has already well borne one or several injections, and who may bear very well the subsequent ones. Some preliminary experiments, as well as numerous researches published on this question by Mouneyrat, Darier, Milian, Ravaut, &c., the publications of Mr. Emery on the dangers of mineral impurities in the water used for the dissolution of arsenobenzol, and more especially the experimental researches of Ch. Fleig on the toxicity of salvarsan, have led me to think that it should be possible to determine more exactly the conditions under which the whole of these troubles may arise and to ascertain the causes by a series of suitable experiments. These experiments bore in the first place on the manner in which a more or less alkalised solution of arsenobenzol or luargol acts in the presence of the salts which are ordinarily found in water and in the blood; and, secondly, on the effect which these various preparations may have on the animal when injected into the veins. The following are the conclusions which were made therefrom:—

All monosodic or disodic products of the arsenobenzol group become turbid and yield a precipitate in the presence of chloride of sodium, carbonates, phosphates, sulphates, and chlorides of alkalies and magnesia, and more especially of phosphates. Some of these precipitates may re-dissolve in the same liquid, others remain insoluble even in an excess of soda. Their formation is prevented or retarded in certain cases in the presence of sugars, and rather accelerated in other cases (for instance, in the presence of glycerophosphate of lime). In general, a trace of these salts (1 or 2 drops of a 1 per cent. solution in 10 c.c.) will suffice to produce an appreciable effect.

If a rabbit is injected with a solution which becomes turbid in the physiological solution of pure sea salt in less than 10 minutes, *a nitritoid crisis is always produced in the animal*, which crisis will be fatal with a dose of 0·20 gm., very grave but not always fatal with a dose of 0·10 gm., very pronounced but not fatal (dyspnœa, diarrhœa, convulsive fits) with a dose of 0·05 gm. The last rabbit will, some hours afterwards, bear very well, without any crisis, a dose of 0·20 gm. of a solution which does not become turbid, in the presence of NaCl in the proportion of 8 : 1000, until after five or six hours. On the other hand, this latter solution will, if injected in the same dose, produce a fatal crisis in the case of a rabbit previously injected—one might say "rendered more susceptible"—with a few centigrammes of a phosphate of lime.

Ch. Fleig has found, in the necropsy of rabbits which had died from an acute nitritoid crisis, that precipitates of arsenobenzol were present in the capillaries of the lungs. Danysz has been able to corroborate this fact, so that his experiments enable him to assert with certainty that *all the troubles which appear immediately or some hours after the injection are caused by the formation of a precipitate in the circulatory system.*

It is scarcely necessary to point out here that the differences in the symptoms observed correspond to the differences in the nature of the precipitate and that these differences may themselves be determined by differences in the richness of the blood in certain salts (temporary or constant), in the intestinal mucous membrane, the skin, the kidneys, the brain, or the lungs. In the latter case carbonic acid may play an important part.

The whole of the troubles observed after injections of the products of the arsenobenzol group are also met with, identically the same, in the anaphylactic crisis, and it would be difficult to find a combination of experimental conditions more appropriate than those of the experiments just made with luargol, *to prove that in an active or passive anaphylactic crisis it is the precipitate which is the principal agent in the pathological manifestations.* In both cases there are the same symptoms, the same causes (formation of precipitates *in vitro* and *in vivo*), the same means of avoiding the crises by anæsthetics or vaso-constrictors, as has been demonstrated by M. Roux with regard to anaphylactic and by M. Milian with regard to nitritoid crises.

Conclusions.

1. Thrombosis, phlebitis, and other local affections caused in the injected veins, if not due to faulty technique, may be attributed to excessive alkalisation of the solution.

2. Affections of a general nature,—vomiting, diarrhœa, shivering fits, headaches, transient rise of temperature—which may appear a few minutes or some hours after the injection, as well as the nitritoid crises, are caused by the dilatation of vessels and the formation of a precipitate which is temporarily retained in the capillaries.

3. The rapidity with which these crises appear, and the degree of their gravity, will depend on the dose of the product injected and its degree of concentration. By increasing the dose the volume of the precipitate is increased; by increasing the concentration its formation is accelerated and the volume and density of the granules are augmented. Sufficient alkalisation of the products will obviate the appearance of nitritoid crises and other troubles in the case of individuals having

blood of a normal average composition. To obviate the troubles caused by soda, the strength of which it is always difficult to maintain at the same percentage, it would be preferable to use chiefly disodic products prepared beforehand.

4. Assuming that the alkalisation is adequate, the formation of precipitates may be promoted by the presence in the solvents of sea-salt, and especially of phosphates, carbonates, sulphates, and chlorides of earthy alkalies and magnesia.

5. The formation of precipitates may be retarded, and the gravity of the nitritoid and anaphylactic crises thus diminished, by the following means: (*a*) By prolonging the duration of the injections and making them in the form of highly diluted solutions; (*b*) by making the dilution with distilled water or isotonic solutions of sugar, which delay the formation of precipitates in most cases; and (*c*) by injecting at the same time anæsthetics or vaso-constrictors.

6. The neutral compounds of the products of the arsenobenzol group, which may be obtained by combination with methylene or formaldehyde sulphoxylate of sodium, *neo* or *novo* arsenobenzols, &c., do not precipitate in the presence of chlorides, sulphates, and carbonates, but will do so in the presence of certain phosphates. These products will therefore not produce rapid crises save under exceptional conditions, but their use gives comparatively more often rise to tardy but graver accidents.

7. As regards the products of the arsenobenzol group, the formation of a harmless or not very injurious precipitate, which manifests itself by slight troubles in from one to six hours after the injection, is an essential pre-requisite of their therapeutic efficacy; time is an important factor in this instance. The sodic products are therefore more active than the neutral (*novo*) products, and when they are well prepared and injected with the necessary precautions, they are less dangerous than the neutral products. In fact, as in order to obtain the same curative effect we are obliged to inject the neutral products in two or three times stronger doses, they will, if retained in the organism through some cause or other and forming precipitates or toxic compounds, cause graver accidents than the sodic products.

8. It seems that under otherwise equal conditions the compounds which produce the same curative effects in relatively smaller doses will also be less dangerous to the patients.

9. It is too soon to say that "102" is the best remedy for syphilis, as we do not even know if salvarsan, "606," really cures this disease, though its great results in many cases are undisputed. But luargol is certainly a step forward in the therapy of syphilis, for it has proved its efficacy, since quite small, non-toxic and generally harmless doses give satisfactory clinical results.

A NOTE ON THE USE OF PERFORATED CELLULOID IN THE DRESSING OF CERTAIN WOUNDS.

BY S. R. DOUGLAS, M.R.C.S., L.R.C.P. LOND.,
CAPTAIN, I.M.S. (RETIRED); FIRST ASSISTANT, BACTERIOLOGICAL DEPARTMENT, MEDICAL RESEARCH COMMITTEE.
(*From the Inoculation Department, St. Mary's Hospital, Paddington, W.*)

THE problem of the alleviation of the pain caused by the removal of dressings which have become adherent to the wound is, at present, of more than usual importance owing to the types of wounds from which so many of the soldiers are at present suffering.

The special types referred to are those which either as a result of the primary injury, or of the operative measures necessitated by the onset of gas gangrene, have lost considerable areas of skin. In such cases the dressings are at times so painful as to act very detrimentally on the patients' general condition. Various methods were tried with the view of solving this problem, the principle of all being to place next the wound surface some non-absorbent material which, however, would allow free passage outwards of any discharges and inwards of any fluid that it was desired should reach the surface of the wound. After the trial of several materials, it was found that there were on the market sheets of perforated celluloid 0·15 millimetre in thickness, the perforations being 1·5 millimetres in diameter, and there being four perforations to each centimetre. This material, which was rather too stiff to be conveniently applied to the irregular surface of the wound, was found to become perfectly soft and pliable, and at the same time somewhat elastic, after it had been soaked in a 5 per cent. carbolic acid solution for a few hours. The carbolic acid solution having been washed away with sterile salt solution, the softened celluloid can be applied to the wound surface and falls at once into all the irregularities, and any suitable dressing can be applied over it. On redressing the wound it is found: (1) That the celluloid lifts off the surface of the wound without causing any pain; (2) that all the discharges from the wound have passed through the perforations, leaving the surface of the wound quite clean; and (3) that the celluloid has regained its original stiffness, thus making an accurately fitting splint, which tends to keep the wounded tissue in a complete state of rest. After the celluloid has been taken off the wound it is cleansed in tepid water and again softened and sterilised by placing it in the 5 per cent. carbolic acid solution. A convenient plan is to have two pieces of the celluloid for each wound, one of which is applied to the wounded area, the other being kept in a 5 per cent. solution of carbolic acid so as to be ready for use.

This material can be obtained in varying thicknesses, the perforations being of the same size and number, and it has been found that the thicker sheets make an excellent material for the making of splints, especially for those cases for whom continuous or intermittent irrigation forms part of the treatment. For this purpose the sheets of perforated celluloid, having been first softened in 5 per cent. carbolic acid solution, are moulded to the injured limb. After the celluloid has again hardened it is attached to a metal framework such as may be readily made with the aluminium skeleton splinting supplied in the field fracture-box.

It was at first thought that the wound granulations would tend to grow through the perforations, but this has occurred only in those cases in which the granulations tended to be œdematous, and in these the celluloid is not required, as ordinary gauze dressings showed no tendency to become adherent to the wound surface.

The material was obtained from the British Xylonite Company, Hale End, Walthamstow, London.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A CASE OF FOREIGN BODY IN THE RECTUM.

BY JOSEPH F. PEART, F.R.C.S. IREL.

I SEND for publication the following particulars, which are interesting as once more demonstrating the safety with which sharp-pointed foreign bodies may pass through the alimentary tract until arrested in a crypt or pocket of Morgagni, and possibly as indicating that wooden skewers should not be used in cooking food.

On May 23rd, 1915, I was called in to seen a married woman, aged 49 years, who was suffering from acute pain in the anal canal of 24 hours' duration. The pain was intense and prevented sleep or rest in any position, especially in any posture which occasioned any pressure upon the anus, such as sitting. The menstrual history was normal. The patient had first had an attack similar to the present one 15 years ago, when the practitioner who attended her examined her vaginally but could not detect any cause for the trouble, and the attack gradually passed off. No rectal examination was made. Eight years later she had another attack, though the pain was not so acute, and at varying intervals of time since then she had suffered from attacks of pain of lesser severity in the same situation. The bowels had been habitually costive, but for years she had kept them open daily with pills and did not remember having passed at any time blood or slime per anum.

There were no constitutional symptoms. Abdominal and vaginal examination gave negative results. Externally

there was no evidence of anal or peri-anal inflammation, but she was extremely sensitive to the least pressure in the anal region. On introducing my finger into the anus the patient at once complained of acute pain, and became very restless and faint. I was not permitted to pass my finger in more than about half an inch above the sphincter; but I felt a hard linear mass in the long axis of the bowel on the posterior wall, about a quarter of an inch in width above and tapering towards the sphincter. On touching it the patient assured me that it was the cause of all the pain. On withdrawal of my finger there was neither blood, mucus, nor fæces attaching thereto; but in spite of the absence of the latter I concluded it was a mass of impacted fæces, though I was quite at a loss to explain the causation of its characteristics. Owing to the painful condition of the patient I decided to defer further examination till the following morning, and ordered an injection of olive oil, to be followed two hours later by a turpentine enema.

On the following morning the patient said she was much easier but still had pain in the anus. Digital examination now revealed the fact that the mass had diminished to the size of an ordinary wooden match in length and width, occupying the same position as on the previous day, but quite hard to the touch. Thinking it was the remains of a fæcal concretion in a linear furrow and ending in a crypt of Morgagni, I proceeded to remove it digitally and succeeded in removing a somewhat jagged splinter of wood (an inch and three-eighths by one-sixteenth of an inch). The patient at once assured me that all pain had gone and that I had made her quite well. She has since remained quite free from any pain in that locality.

That the splinter of wood was not introduced either purposely or accidentally per anum I am quite convinced; probably it was a portion of a wooden skewer used in trussing meat, which was cut off in carving and swallowed with the food.

Though more interesting examples of foreign bodies in the rectum have been cited by Pilcher, Pierra, and others, there are two points about this case which arrest attention. My patient, who is an intelligent person, is very persistent in asserting that the attacks of 8 and 15 years ago were precisely similar to the present one, and quite believes that this same splinter of wood has been the cause of all the rectal trouble. That it was not acting detrimentally to the tissues as a foreign body all that time is obvious, for I could not detect any ulceration or abscess, conditions which usually result from impaction of foreign bodies for even a short time. Is it possible that the splinter of wood had remained in that patient's rectum for over 15 years? It is generally recognised that a foreign body may remain in the rectum for a long time, but I cannot find any longer period recorded than that of 31 days in Weigand's case. But owing to the emphatic opinion of the patient, who has remained quite free from all rectal pain or trouble since the removal of the splinter of wood, and in the absence of any evidence to be found of any other local condition which could account for the previous attacks, is it unreasonable to attribute the attacks of 15 and 8 years ago, and the numerous more recent attacks of lesser severity, to the splinter of wood rather than to a succession of foreign bodies in a normal person who leads a rational life, and in the absence of any peculiar abnormality of the patient which would favour the ingestion of such foreign bodies?

Harley-street, W.

LIGATURE OF THE RIGHT INTERNAL ILIAC ARTERY FOR SECONDARY HÆMORRHAGE FROM THE BUTTOCK.

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AND
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LIGATURE of the internal iliac artery for secondary hæmorrhage from the buttock is of sufficient rarity to warrant notice, and for that reason we venture to publish details of the following case:—

The patient was admitted into a base hospital in France on April 29th, 1916, suffering from a large shrapnel wound of the right buttock. The wound was septic and plugged with gauze. Notes from the casualty clearing station stated that considerable bleeding had occurred, which had been treated with gauze plug and pressure. The plug was removed, revealing a sinus leading down to the sciatic notch and containing much blood clot. The wound was dressed with eusol and light gauze packing was introduced. May 1st: General condition of patient showed signs of improvement, but on the 2nd and 3rd slight hæmorrhage occurred. May 4th: An operation was performed with the intention of securing the bleeding point. The track was explored, clots were removed, but no definite bleeding vessel was discovered, merely venous ooze, which stopped after the track was thoroughly washed out. On account of the depth of the track and the musculature of the buttock it was not considered wise to proceed further, especially as the bleeding had stopped. The patient continued to improve until May 10th, when a slight hæmorrhage occurred, and again at 7.30 P.M. the same day a second severe hæmorrhage took place and his condition became serious. A further operation was decided upon and the question arose as to the advisability of ligating the internal iliac by the transperitoneal route or attempting to find the vessel through the gluteal wound. The ligation of the internal iliac was preferred for the following reasons:—(1) The absolute necessity of finding and ligating the bleeding vessel, as another hæmorrhage would probably prove fatal; (2) the difficulty of finding the bleeding vessel deep in a large muscular buttock; (3) the loss of blood, both venous and arterial while attempting this; (4) the possibility of the hæmorrhagic site being intrapelvic; (5) the disfiguring and disabling effects of cutting through the gluteal muscles in the attempt to open the wound, find the vessels, and the probability of prolonging convalescence.

May 10th: Operation.—Saline was administered into the axilla through a Lane's transfusion apparatus before operative procedure was commenced, and was continued during the whole of the operation. A median incision was made from the umbilicus to the pubes. The abdomen was opened and the patient was then lowered to the Trendelenburg position. The chief difficulty was due to a fatty abdomen with great extraperitoneal fat and a fatty omentum, which obscured the vision and which necessitated the incision being enlarged to 1½ inches above the umbilicus in order to allow the intestines to be well packed away in the upper half of the abdomen. The right sacro-iliac synchondrosis was then defined and the ureter and common iliac vessels localised. The posterior layer of the peritoneum was then picked up with forceps, incised, and with blunt dissection the internal iliac artery was defined and the vessel ligated in continuity. The slit in the peritoneum was sewn up and the abdomen was closed.

The patient made an uninterrupted recovery, with no further hæmorrhage. The abdominal stitches were removed on May 22nd. The gluteal wound and patient's general condition improved every day, and on June 14th he was sent to England.

As implied from the above, the difficulties in the operation are few. With an ample incision and an acute Trendelenburg position, even the difficulty of packing off the intestines becomes comparatively simple. The vessel is easily exposed, and the needle can be passed without risk to ureter or vein. There was no necessity in this case to draw any of the intestines out of the abdomen.

Mr. James Morrow, B.A., M.B. R.U.I., was accidentally drowned on Sept. 8th as he was bathing off the Irish coast at Downhill, Co. Londonderry. He was in practice at Irlams-o'-th'-Height, Manchester.

YORK COUNTY HOSPITAL.—At a quarterly court of the governors of this hospital, held on Sept. 12th, it was reported that during the past quarter 482 in-patients and 1974 out-patients had received treatment. During the three months 166 wounded soldiers had been treated, there being 111 military cases on one day. Mr. W. F. H. Thomson, in moving the adoption of the report, said that but for the fine response through the workpeople's collection the hospital debt would increase disastrously. The expenses to the end of June amounted to £6900 and the income to £4500. The report was adopted.

DONATIONS AND BEQUESTS.—An anonymous shipowner of Cardiff has given £5000 towards the establishment of a Welsh branch of Queen Mary's Convalescent Auxiliary Hospitals.—The late Mr. F. Andrew, of Lincoln, has left by will £1000 to the Lincoln County Hospital and £500 to Lincoln General Dispensary.—Dr. William Barrett Roué, recently deceased, has left £300 to the Bristol General Hospital for the purpose of founding a scholarship for medical students of the hospital, the scholarship to be called the "Barrett Roué Scholarship." Dr. Roué was himself an old and distinguished student at the hospital, in which he always took a warm interest. He practised for many years in Clifton, and was also well known as one of the physicians to the Bristol Royal Hospital for Sick Children and Women.

Reviews and Notices of Books.

The Autobiography of Sir Peter Eade, M.D., F.R.C.P., with Selections from His Diary.

Edited by SIDNEY H. LONG, M.D. London: Jarrold and Sons. 1916. Pp. 211. Price 7*s.* 6*d.*

THE life-story of a man who lived in five reigns, who was a distinguished member of the medical profession, and in addition thrice mayor of the ancient and honourable city of Norwich might have been, and if told at length probably would have been, of great interest. But the book now before us is, as its editor confesses in his introduction, somewhat disappointing. Sir Peter Eade was born in 1825 and his autobiography proper only extends as far as the year 1847, while between the end of the autobiography and the commencement of the diary there is a gap of nine years. Sir Peter Eade quotes in his preface a remark of Sir Conan Doyle as to the difficulty of composing an autobiography, and he seems to have felt the difficulty himself. The picture which he draws of his school life at the Yarmouth Proprietary Grammar School is of interest in these days of "modern sides," and we note that his class had to learn the whole of Horace's Odes by heart. The same custom obtained at Eton in the "seventies." In 1844 young Eade entered at King's College, London, as a medical student. He had previously served an apprenticeship to his father, who was a medical practitioner at Blofield. Sir Peter Eade notes that his father used to prepare his own extracts of white poppy, henbane, roses, and hemlock, the plants for the first three being grown by himself. In 1847 Eade graduated M.B. of the University of London, obtaining a University medical scholarship and three gold medals, but being unable to afford to stay in London returned to Blofield. Here his autobiography ends, and the history is continued from his diary of 1856, in which year he was elected an honorary physician to the Norwich Public Dispensary and settled in Norwich. The diary is mainly concerned with items of municipal interest, but there is an entry concerning the diphtheria epidemic of 1856, recording the occurrence of diphtheritic paralysis. A paper on these cases by him appeared in our columns under date July 16th, 1859 (p. 56). On Oct. 19th, 1905, a statue of Sir Thomas Browne was unveiled in the Haymarket, Norwich, by Lord Avebury. This memorial to one of Norwich's most worthy citizens was due in a great measure to Sir Peter Eade's untiring exertions as chairman of the executive committee. His long and useful life came peacefully to an end on August 12th, 1915; he was in his ninety-first year. The autobiography and the diary, imperfect as they are, are of much interest, and should be read by all medical men as a simple record of the life of a most useful member of their profession.

Mentally Deficient Children, their Treatment and Training.

By G. E. SHUTTLEWORTH, B.A Lond., M.D. Heidelb.; and W. A. POTTS, M.A. Cantab., M.D. Edin. Fourth edition. London: H. K. Lewis and Co. 1916. Pp. xix. + 284. Price 7*s.* 6*d.* net.

THE fourth edition of this excellent manual shows evidence throughout of having been completely revised and brought up to date. In view of the increasing public attention which has been devoted to the class of the mentally defective, culminating in the passage through the Legislature of the Mental Deficiency Acts, it was to be expected that the authors would deal with the resulting educational and administrative changes, and this has been done in a useful and practical manner. From the point of view of the clinician the descriptions of the varieties of mental defect, organic and functional, leave nothing to be desired; from the point of view of the institutional physician, the medical examination of mentally defective children under the regulations of the Board of Education, their educational, industrial, and moral training, and the question of recreation, are all handled in an eminently serviceable way. The appendices giving lists of institutions recognised under the Acts, tables of exercises and of London County Council special school methods, and other cognate matters, will be found of practical value. With a good bibliography, and with excellent photographic illustrations, the book is wonderfully compact of all that has a bearing on the problem of the mentally defective, and in its new form is certain of a wide circulation.

LIBRARY TABLE.

Aids to Obstetrics. By SAMUEL NALL, B.A., M.B. Cantab., M.R.C.P. Lond. Revised by C. J. NEPEAN LONGRIDGE, M.D. Vict., F.R.C.S. Eng., M.R.C.P. Lond. Eighth edition. London: Ballière, Tindall, and Cox. 1916. Pp. viii. + 216. Price 2*s.* 6*d.* net.—This little book has long been a favourite with students, and is no doubt a useful work for examinations. The reading of such books has dangers, because it is impossible for the student to obtain a sound knowledge of his subject from them; but if he appreciates this fact, they serve as valuable introductions to wider reading, in fact as "aids," which is all the author claims in his title. But in these abbreviated accounts of the principles it is difficult to avoid some ambiguity, and an instance of this may be seen in the section dealing with the treatment of cases of placenta prævia. The reader is told that the text-book rule in these cases is to empty the uterus as soon as the condition has been diagnosed, a statement which represents a half-truth and is therefore misleading. The correct statement is to induce labour, not to empty the uterus, allowing the patient to do this for herself, a different procedure altogether and a most important distinction. The description given of the mechanism of separation of the placenta is only one of two, and not certainly the more correct one. The statement that rupture of an isthmial tubal gestation usually results in the ovum passing into the cellular tissue between the layers of the broad ligament requires proof, and is probably not correct. The examples we have given illustrate the dangers of attempting to compress so much within so small a compass, and the risks the student runs who relies upon a book of this kind for his total information instead of using it intelligently.

Pro Patria: A Guide to Public and Personal Service in War Time. Edited by T. N. KELYNACK, M.D. Volume I. London: John Bale, Sons, and Danielsson, Limited. 1916. Pp. 260. Price 3*s.* 6*d.* net.—The service of the male between the ages of 18 and 41 years inclusive is at present directed for him by the State and he has little personal choice in the matter, but to the several million adults who can choose some part at least of their working activities a finger-post is desirable to indicate in what form of public or personal service they can suitably play their part in war time. Dr. Kelynack has endeavoured in "Pro Patria" to provide such a finger-post, and he has achieved his task with a considerable measure of success. His aim has been to provide an authoritative directory to the chief societies and associations, institutions, and other agencies now rendering service for the nation and giving assistance to the individual. A summary is given of 129 such institutions defining the nature and scope of each and stating the person to whom to apply for further information. This directory occupies just 100 pages and is the mainstay of the book. A series of short signed articles on various aspects of service occupies another 25 pages; these deal with such general subjects as the foundations of patriotism, discipline, sacrifice, and economy, and with the special work of teachers, schoolboys, boy-scouts, the Y.M.C.A., and so forth. The work of the universities then has special mention. After the directory are given brief reviews and notices of books and journals, with notes on preparations and appliances likely to be of service in patriotic and war work. The appendix contains a list of the hospitals of the Order of St. John and of the British Red Cross Society. We anticipate a wide circulation for this practical guide.

Changes in the Food-Supply and their Relation to Nutrition. By LAFAYETTE B. MENDEL, Professor of Physiological Chemistry in the Sheffield Scientific School of Yale University. Yale University Press. 1916. Pp. 61. Price 50 cents.—Professor Mendel's essay was written for the Pan-American Congress at Washington in December, 1915, and is a plea for increased attention to the nutrition of the great mass of the people. This, he agrees with Rubner, has so far mostly been studied with regard to political economy and according to methods and view-points which do not always withstand the tests of the physiology of nutrition. He discusses the possible insufficiency in the future of the wheat crop and the substitution in part of proso millet and kaoliang, tropical annual grain, which are drought resistant. The essay deals interestingly with a very pressing topic.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 23, 1916.

The School Medical Service.[1]

THE annual report of the Medical Department of the Board of Education for the year 1915, made by Sir GEORGE NEWMAN, the chief medical officer of the Board, to Mr. ARTHUR HENDERSON, the President of the Board, appeared last week. It is the eighth of this series of reports, and furnishes a record of the School Medical Service of England and Wales during a terribly trying period of time. Owing to the circumstances of the war the work carried out under the general direction of the Board of Education has of necessity been curtailed, but, although Sir GEORGE NEWMAN'S report is merely a summary of what has been done, we can see from it that such curtailment as has taken place has produced no alteration of standards or relaxation of efforts in the important places—which is very satisfactory tidings. There has been, on the whole, a growing appreciation of the importance of the School Medical Service to the welfare of the nation, and the successful endeavour on the part of the authorities and their officers to maintain the service in high efficiency has been due in some respect to hearty public coöperation.

The chief medical officer defines the scope of the School Medical Service towards the 6,000,000 children in the elementary schools of England and Wales as threefold, and sums up the triple duty upon the service in something like these terms: (*a*) To select by systematic medical inspection the ailing child and to remedy the disabilities discovered; (*b*) to provide the conditions of health, and remove the conditions of ill-health, for the normal child; and (*c*) to lay the national foundations of physical education. And if the report is read with the clear idea that this is the objective aimed at by those whose work is being chronicled, we must come to the happy conclusion that the administration of the School Medical Service has not suffered during the war as much as must have been expected by many in a position to judge. The need for extraordinary arrangements, owing to the demand for medical officers to meet the requirements of the naval and military authorities, has grown more urgent as the war continues, and as our operations both by land and sea increase in magnitude, so that all local education authorities have found it difficult to maintain the School Medical Service undisturbed. Public economy has dictated retrenchment in various directions, while the supply of school medical officers has been found insufficient to continue certain activities which had been set on foot. However, during 1915, 240 areas, comprising most of the smaller ones, out of a possible 317 were able to continue work more or less on the lines laid down before the war, and in some of these centres all the contemplated arrangements for treatmen were carried out. We notice with pleasure that London, where the enormous crowds to be dealt with have too often led to the relegation of the metropolis to a disappointing position in the scheme of educational progress, has come with flying colours out of the trials of the situation. Dr. W. H. HAMER, medical officer for the County of London, has been able to report that the work of the School Medical Service, which he directs, was, on the whole, well maintained throughout the year. Embarrassments were experienced in continuing some of the work commenced in easier times, but previous standards have not been materially lowered in any direction. Twenty school doctors volunteered for war service in the metropolitan area, but it was found possible to replace them in all instances and to cover effectively the field of necessary work. An even more satisfactory condition of affairs is reported by Dr. LEWIS GRAHAM, temporary school medical officer at Birmingham; but all education authorities in great centres like London and Birmingham have not been so fortunate, and some have found it impossible to carry out their projected schemes of work with a sorely depleted staff.

Sir GEORGE NEWMAN states that by June 1st of this year (1916) 86 school medical officers, 199 assistant school medical officers, 53 specialist medical officers, 185 school nurses, as well as many attendance officers and clerks engaged in the work of the School Medical Service, had joined the Forces. Satisfactory substitutes have been obtained, it appears, for the nurses in most cases, but the net loss in medical officers approximates to 12 per cent. The Board of Education have met the position sensibly, admitting that the increasing demands for medical men with the Forces would make it impossible to maintain the School Medical Service on a peace footing. From the moment that the need for many civilian medical men, especially in the Royal Army Medical Corps, became obvious no obstacle was placed in the way of a school medical officer volunteering for service, even though his absence rendered a temporary curtailment of the work of the service inevitable. In this position it was suggested to local authorities that, where curtailment had to be made, medical inspection of ailing children of all ages, as well as the maintenance of any arrangements for treatment undertaken by the authority, should be regarded as the first charge on the time of the staff. Thus, and as a result of wise official guidance, systematic inspections of the ailing child have been carried on not only at the clinics, but at the schools, and the value of the lesson to be learned from such inquiry has not been sacrificed, as it largely would have been if the inspections had been interrupted. In many areas the coöperation of the teachers in school medical work has been splendid; they have relieved the medical staff of such work as taking and recording heights and weights of the children, and at medical inspections have been instrumental in enlisting the sympathy and interest of parents who have been

[1] Annual Report for 1915 of the Chief Medical Officer of the Board of Education. London: Eyre and Spottiswoode. 1916. Price 9*d*.

inclined to withhold their children from examination. And, as always, the teachers have been the main sources for notifying the ailments of children to the medical service and in combating conditions of personal uncleanliness among the children. The debt that is due by the public to the ill-paid teachers in the State schools is thus added to substantially, and when their position comes under review—as it must soon come—for an improvement of the conditions under which they carry out their hard and priceless work, they should secure the influence of medical men for their cause.

From the data derived by medical inspection during the past eight years of the children of the State schools it may be concluded, Sir GEORGE NEWMAN says, that not less than a million children of school age in England and Wales are so physically or mentally defective as to be unable to derive reasonable benefit from the education which the State provides. It is of paramount importance from patriotic, no less than from humanitarian, grounds that such a wastage of the population and of the national potentiality should not occur. The steps that can be taken by the School Medical Service to provide the conditions of health, and remove the conditions of ill-health, for the normal child must be taken at all costs. The circumstances in which medical treatment can be supplied are dealt with in a practical section of his report by Sir GEORGE NEWMAN. He is firm upon the necessity that the School Medical Service should provide a system of medical treatment and not content itself with inspection, however careful, leaving the question of treatment to take its chance. His words are these:—

"The fact is that the State cannot afford to leave this matter to chance, for the simple reason that the result would be, as it has been in the past, that the defective child would not, as a rule, receive treatment. Now there are two practical reasons for this. First, the child does not obtain treatment in the absence of means of treatment; and, secondly, the child does not obtain treatment if there are difficulties of approach, even when the means exist. About this there is no manner of doubt. Experience has proved it. Nor is there any doubt as to the solution of the problem. It is the provision of adequate and available means of treatment and the removal of deterrents to its acceptance."

There has been a steady increase for some time in the amount of provision of medical treatment by local education authorities, and public opinion is undoubtedly in favour of a movement which has been based upon the revelation by medical inspection of the amount of defect and disease, mostly curable, existing among our population of school age. Education authorities, however, have not been enthusiastic in taking the view laid down by Sir GEORGE NEWMAN, for the removal of parental responsibility and the addition to the burden of rates have alike been causes of apprehension. Lastly, medical opinion has been far from unanimous on the subject, not a few general practitioners fearing that the State was proposing to take over a great deal of interesting work from the profession—work which might not in any case be particularly remunerative, but which would be of enormous value from the point of view of experience; work, moreover, which appealed to the best kind of medical sentiment. This view Sir GEORGE NEWMAN puts aside, perhaps a little briefly, stating that private medical practice has not been shown to have suffered by the development of State medical treatment for school children, the children dealt with having been those who otherwise would not have obtained treatment, adding that the treatment which has been provided has in a large number of cases been given by private medical practitioners working under the local authorities. This is the direction in which we should like to see the School Medical Service actively developed.

Venereal Diseases in Peace and War.

WE notice at length in THE LANCET this week a Report,[1] which has been recently made to the German National Council for Combating Venereal Diseases, upon the control of these diseases during the war, and their relation to prostitution and to the existing catastrophic conditions. We have all known that for many years, 30 or 40 perhaps, there has been a considerable and steady reduction of venereal diseases in the Prussian Army, but the important question to-day is whether that reduction has been maintained either in the Prussian or in the other armies of the Central Powers since 1914. The conclusion arrived at by a study of the Report to the German National Council is that there has been a great increase in venereal diseases in the fighting lines of our enemies, as well as in the territory which they are occupying, for it is particularly in those miserable districts that the German soldier has received unbridled licence. That the German authorities have become extremely anxious about this state of affairs is quite certain, for military and police orders in connexion with prostitution and with provocation to immorality have been issued freely, while control of prostitution and the enforcement upon the soldier of a ritual of prophylaxis have both been tried, as have educational propaganda. But how the Germans have made real headway against the mischief is by the organised institution for the comfort and entertainment of the men, where this has been possible, and here our own country has already done much for its large and new Army.

Simultaneously with the appearance of the German Report we received from Australia the Report on Venereal Diseases[2] which has just been issued by a Commonwealth Committee. This document also is of paramount interest to the medical profession and the public in this country, where the findings of the Royal Commission on Venereal Diseases are about to be confirmed by State action. The Australian Report suggests that the incidence of these diseases in Australia is not widely different from that in the

[1] See page 567.

[2] Commonwealth of Australia. Department of Trade and Customs. Committee Concerning Causes of Death and Invalidity in the Commonwealth. Report on Venereal Diseases. F 7594. Albert J. Mullett, Government printer for the State of Victoria.

mother-country. To the Tenth Australasian Medical Congress, held at Auckland two years ago, a report was presented stating that 12 to 15 per cent. of the population of London, Paris, and Berlin were known to be syphilitic, and adding: "There is good reason for thinking that Australian cities are affected to much the same extent." The figures upon which this information is based are not given, and those which are given are not very easy to interpret. More than ten years ago Professor Sir HARRY ALLEN found signs of syphilis in 53 out of 100 consecutive post-mortem examinations performed by him in the Melbourne Hospital, and a further 100 analysed for the Eighth Australasian Medical Congress, held at Melbourne in 1908, gave much the same result. Sir HARRY ALLEN rightly pointed out that the results proved a high incidence in the hospital population, but did not truly represent the incidence of syphilis in the general population of Victoria. Less difficult of interpretation are the figures given by Dr. J. W. BARRETT, who applied the Wassermann test to 550 patients attending his eye clinic, irrespectively of the disease from which they were suffering—many of them were refraction cases—and found a positive reaction in 47, and a partial reaction in 31. We shall, at all events, be hardly wrong in assuming that the prevalence of syphilitic infection amongst the general population of Australia is not under 10 per cent. The report goes on to state that gonorrhœal are far more common than syphilitic infections in the Commonwealth. At a special clinic in Sydney the proportion is as 3 to 1, and 500 children are treated every year for gonorrhœa at the Children's Hospital in Sydney.

The recommendations made in the Report for dealing with this appalling state of affairs are definite and comprehensive. They begin with the suggestion of an educational campaign. For boys, it is said, the necessary teaching should be given at about the age of 15, preferably by father or schoolmaster, and not in class. The school medical officers and chaplains are also to take part in the instruction. To reach adults technical and trade schools should include on their programmes lectures on chastity and the evil fruits of promiscuity, while soldiers on enlistment should receive a warning, to be repeated every year. The regimental medical officer, the Report states, is the best instructor, and here experience in this country bears out the Australian Report, and is at variance with the German document. The necessity of continued education of the medical profession, and of the students as they enter it, in all questions relating to venereal disease is emphasised. This involves the provision of proper means for diagnosis and treatment, and the Committee considers that diagnostic tests should be available in every case without charge, and should be carried out by competent persons. The experience of an evening clinic at the Royal Prince Albert Hospital in Sydney, where patients are treated by a special staff with large experience in new methods, is held to justify an extension of such facilities to all existing hospitals. All State-aided hospitals are recommended to provide for the treatment of patients with venereal diseases, and when existing hospital accommodation is insufficient it shall rest with the Government to supplement it as far as necessary. Special hospital provision for infected seamen is also held to be a matter of immediate urgency in Australia.

To carry out the aims thus set forth the Report contains a series of proposals for special legislation. It shall be made unlawful for any person other than a legally qualified medical practitioner to treat any case of venereal disease. The person suffering shall be required to place himself (herself understood) under medical treatment. The medical practitioner who treats him shall notify to the appointed health authority the sex, age, and complaint of the patient, but not the name. He shall also inform another practitioner of any patient who has transferred from the other's care. If the patient omits to report himself regularly for treatment until he is cured, and the doctor fails to receive a notification that he has come under the care of a second practitioner, the patient's name and address shall then be communicated by the doctor to the health authority. The responsible Minister shall then have the right to order the detention and internment of any such person suffering from venereal disease, who is not under the care of a medical practitioner. The practitioner shall be required to give to each patient a written notice of the infectious character of the disease from which he is suffering, and of the legal penalty which he will incur for communicating it to another. When the patient is cured he will receive a certificate to say so. A last proposal is the prohibition under penalty of all advertisements or public statements concerning any remedy for venereal diseases. It will be seen that in some directions the proposals, though in the main similar to those of the British Royal Commission, go further than the latter. In the freer atmosphere of the Commonwealth, where custom and tradition play a smaller part, the proposals are pressed to their logical conclusion.

Above and beyond their formal recommendations the Committee go on to suggest legislation on wide lines, and in connexion with the proposals the Report of the German National Council should be read. For in that Report the possibility of the end of the war leading to a grave increase of venereal diseases among the civil population is considered, and bearing this possibility in mind thoughtful citizens may be ready to acquiesce in measures which otherwise they would have resented. Under the legislative proposals for Australia the disclosure by a medical practitioner to the second party to a marriage of the presence of venereal infection in the first shall be privileged; the presence of venereal disease at the time of marriage, unknown to the other party, shall constitute a ground for a decree of nullity; still-births from the sixth month onwards shall be registered; prisoners suffering from venereal disease shall be detained so long as infection is present; solicitation in the streets by men or women shall be

sternly put down. These suggestions are also in line with those of our own Royal Commission, though they scarcely come within the scope of the schemes which local authorities are now framing with the assistance of the Local Government Board. But they may well be borne in mind by those who have to frame these schemes, for there is no doubt that legislation will follow the consensus of opinion which emerges from the practical working out of the schemes.

Annotations.

"Ne quid nimis."

PROVISION FOR THE MEDICAL MAN'S ORPHANS.

THE war has profoundly modified the position of the medical man, both in regard to his prospect of immediate success in his profession and of living sufficiently long to make adequate provision for those dependent upon him. The regular members of the Royal Army Medical Corps will doubtless, on entering upon their career, have considered the special risks to which such a career exposes them, but there are now thousands of medical men who have gone or who are liable to go on active service as officers of the Special Reserve, the Territorial Force, or of the New Armies, to whom the risks of army service have unexpectedly been imposed on those of civilian life. To some extent this risk may be gleaned from the figures which appear in another column. (See p. 579.) The numbers of past and present students of the various large metropolitan medical schools who have joined the Navy and Army are there compiled, with a statement of the honours awarded to them and of the numbers who have died on service. The figures are not yet complete. During the first two years of warfare at least 150 medical men attached to these schools alone have died as a result of their service, and a reference to our war obituary columns from week to week will show that many of these men, although married, have obviously not had sufficient time in case of early death to make provision for their children out of professional earnings. In the Regular Royal Army Medical Corps a fund has existed for nearly 100 years for affording relief to orphans of officers, and the scheme for extending this help to the auxiliary branches has now been successfully inaugurated. The Director-General of the Army Medical Service presided at a general meeting of officers of the auxiliary branches of the Service early in June, and the scheme formulated by a provisional committee appointed at this meeting has been carefully considered by the officers concerned in all parts of the country, and has received the approval of 92 per cent. of them. At the meetings of the Auxiliary Royal Army Medical Corps Funds held on August 7th a committee was appointed with power to co-opt other officers up to a total of 20, and full power was granted to them to put the scheme into execution and to administer the funds. An appeal has now been issued by this committee and has been sent personally to all Auxiliary Royal Army Medical Corps officers, inviting them to become subscribers to the officers' benevolent branch. The committee hopes that all these officers will feel it their duty to support this branch with a view to assisting the orphans of their brother officers in the Corps. They appeal especially, and with justice, to those officers whose military duties do not prevent them from continuing to carry on their practices. The appeal should command universal assent and a particularly favourable token of success lies in the fact that among the 8 per cent. of officers who were opposed to the scheme in principle a considerable proportion stated that they would be willing to subscribe to the fund.

"TEAR" SHELLS.

A NEW and frightful weapon of warfare introduced by the Germans is the lacrymal shell, and considerable speculation has turned upon the nature of the tear-exciting substance employed. There are, of course, many well-known substances which in contact with the moist tissue of the eyes cause extreme irritation, and the copious flow of tears that results is the natural attempt to remove the irritant. Perhaps the most homely example of a tear excitant is the freshly cut onion which gives off only a very small quantity of acrid sulphur oil, but sufficient to cause some pain and a flow of tears. One of the most powerful of tear excitants is acrolein obtained in the burning of fats or glycerine, but it is certain that the enemy would destroy no fatty substances. Another acrid gas is formaldehyde, which possibly has been brought into service, but it is more likely that pepper has been used, judging from the reports of those who have been exposed to this baptism. Pepper has, indeed, been used in civil affairs to bring about the surrender of persons who have shut themselves up and defied capture by ordinary means. The plan has usually been to burn the pepper on a shovel and to direct the stream of irritating acrid fumes produced into the apartment. The tear-exciting constituent is probably capsicine, driven out of the pepper by heat. Common pepper appears to answer the purpose quite well, but cayenne pepper or the dried chilli gives off an extremely pungent vapour which is absolutely irrespirable and exceedingly irritating. It is reported that the enemy is paying a very high price for pepper, and it has been assumed that the condiment was wanted for use in this way as an offensive weapon, but it is quite conceivable that paprika, or red Hungarian pepper, suits their purpose better. Large quantities of this pepper are grown in Hungary, where it is a very favourite condiment, having the qualities of a mild cayenne. Tear shells are a modern horror added to war, but protective measures are comparatively simple to adopt.

AFTER-WAR EMPLOYMENT OF EX-SERVICE MEN.

Sir Rider Haggard[1] in his report to the Royal Colonial Institute upon his personal inquiries as to the prospects of ex-soldiers and sailors settling on the land in the oversea dominions, is able to give a general outline of the result of his investigations. He is able, that is to say, to supply upon the direct authority of ministers and high officials a summary of the situation so far as it concerns prospective settlers of the class indicated in South Africa, Australia, New Zealand, and Canada. This includes the extent to which the Government

[1] The After-War Settlement and Employment of Ex-service Men in the Oversea Dominions. The St. Catherine Press. Price 3d. net.

departments of the respective territories are willing to provide land, and sufficient is said to indicate to those who read between the lines as to the class of man or family who would be likely to benefit by the emigration suggested. The knowledge acquired from Sir Rider Haggard's report will, however, have to be supplemented by closer inquiry before any prudent decision can be arrived at by individuals. An interesting discussion conducted by correspondence between Sir Rider Haggard, Mr. Jesse Collings, and Mr. Wilmot Corfield upon the comparative claims of settlement upon the land in Great Britain and oversea will be found included. We are inclined to think that Sir Rider Haggard has the best of the argument so far as it carries us, and that his reasons in favour of emigration, as well as the facts that underlie them, are likely to weigh with many of those who some day may consult his report when making their plans. It is easy to prophesy, as Mr. Collings does, that for these men "there will be no sufficient employment in the industrial world in England," but we would rather wait till war has ceased for six months or even for a year or two before settling in our minds what the demands of industry will be. It is easy, again, to write of "nine-tenths of England that might be cultivated." We have seen similar statements elsewhere of a huge acreage which might be cultivated in Cornwall, a county which in many districts is extremely fertile. It is, however, a different task to enable men to whom agriculture may be a new pursuit to earn a living where their ancestors, when farming prosperously, failed to "see money" in further reclamation of land. The definite prospect of making a livelihood will be the condition which the prudent will ask for. A healthier life in freer surroundings for themselves and their families will be the attraction that will weigh in the balance when the relative merits of urban and rural industries come to be estimated.

THE ACTION OF TOXINS ON THE CENTRAL NERVOUS SYSTEM.

AN account of some interesting and important observations on the conveyance of toxins to the central nervous system and of their action there is given in a paper which is published in the August number of the *Edinburgh Medical Journal* by Dr. David Orr and Major R. G. Rows, R.A.M.C. As the result of a study of many cases of suppurative and other septic conditions, they found that there takes place a spread of the toxin by means of the lymphatics of the nerve trunks, and that the poison enters the spinal cord at the site of "origin" of the nerve and attacks the nerve-fibres at the point where they lose their covering of neurilemma. The degeneration can sometimes be traced from the anterior roots into the grey matter, where it terminates among the cells. To confirm these observations experiments were made on animals by placing celloidin capsules containing pathogenic organisms in contact with selected nerves, and examining the nerves and central nervous system subsequently. The results corresponded with those seen in human disease. Thus when the sciatic nerve was involved, a degeneration of the exogenous system of fibres in the posterior columns of the cord was induced, beginning, as in the human cases, where the fibres lose their sheaths, and involving the root-entry zone and the collaterals passing into the posterior cornua. If nerves in the cheek were selected, the degeneration passed into the pons and medulla. Hence it seems proved that poisons pass along the lymph-channels of the nerves and exert a direct local action on the cord and medulla, passing round the cord to some extent and entering along with the prolongation of the pia-arachnoid. Other experiments were made to simulate a hæmatogenous intoxication by placing the infective capsules in the peritoneal cavity, in which case no direct neuritis of peripheral nerves resulted, the condition resembling an alimentary toxæmia. In these cases there were found a primary degeneration of the myelin sheaths of fibres round the periphery of the cord, œdema of the cord, proliferation of the peri-vascular neuroglia, and dilatation of the vessels with hyaline thrombosis. In this last the hyaline material first lay along the sides of the vessels, giving rise to a network extending from side to side, and finally obliterating the lumen completely. Although in these cases there is apparently a hæmatogenous infection, the observers suggest that the poison also affects the sympathetic nerves, thus exciting the vascular reaction observed. Applying the results to human neurology, it would appear that acute and chronic myelitis are due to infection ascending along the nerve trunks. Dementia paralytica is also to be regarded as a chronic inflammatory disease of lymphogenous origin, and tabes dorsalis is similarly produced. Infantile paralysis falls into the same group, the most striking member of which is seen in Landry's paralysis. On the other hand, the affections of the cord which are met with in anæmia, Addison's disease, and so forth, are to be classed as hæmatogenous, showing no inflammatory lesions.

RED CROSS AND KINDRED WORK IN SWITZERLAND.

THE recent statement in the press that 50 French nurses are being entertained at Montreux for three weeks as guests of the Swiss Government suggests a review of the various forms of beneficent action in which Switzerland has engaged during the past two years. It will be known to all that Geneva was the home of the Red Cross movement and the birthplace of Henri Dunant, who devoted his life to it. Far from obtaining due personal recognition for his work or material reward, he was for much of the latter part of his life unknown and in want, and only when he was quite a broken-down old man, just maintaining his existence at a nursing home above the Lake of Constance, did any public recognition of his life work come to him in the form of an annuity from the Empress Mother of Russia and of one of the Nobel prizes. The Bernese Comité de Secours aux Prisonniers de Guerre arose in December, 1914, as a branch of the Swiss Red Cross. For almost two years it has sent a constant stream of food and clothing to necessitous prisoners in all countries, with special attention to the invaded regions with their dispossessed inhabitants. Up to the beginning of August 150,000 packets have been sent, and the Italian internés in Austria have been the concern of the most recent branch of the work at Lugano. From the beginning of the war Geneva has been the bureau of exchange for information concerning prisoners of war and 2000 or more voluntary workers have been constantly engaged in putting relatives in touch with "missing" soldiers. This means of inter-communication was available long

before the War Office officially undertook the work. The action of the British minister at Berne, E. M. Grant-Duff, and of his devoted wife, in superintending the despatch of parcels of bread and other necessaries to the interned men at Ruhleben, was rendered possible by Switzerland's central position and the facilities afforded by the Swiss authorities. On the outbreak of the war in August, 1914, when all European through traffic was abruptly stopped, and nothing except ready money was accepted for goods, numberless visitors from all parts of the world were held up in Switzerland, and many who were quite unable to pay for board and lodging received hospitality for weeks. The Swiss medical man, having no wounded of his own to tend, has in many cases undertaken service abroad, and some of their most eminent surgeons will be found across the frontier at such places as Lyons and Strassburg, rendering expert assistance to the wounded there. Switzerland is, of course, the haven for the interned prisoners of both sides who have been partially disabled but not rendered so incapable of service as to permit of exchange and return to their homes. The train-loads of the totally disabled and exchanged prisoners passing in the night from Geneva to Schaffhausen and *vice versa* have been literally besieged by sympathisers offering food and presents of all kinds. When the time comes for an assessment of the share which neutral countries have taken in the present war Switzerland will not be found to have been wanting.

THE DANGER OF NITROUS OXIDE AND OXYGEN ANÆSTHESIA.

IN the *Medical Record* of July 29th Dr. J. F. Baldwin has published an article to show that the combination of nitrous oxide and oxygen is "the most dangerous anæsthetic." He describes 12 fatal cases which have occurred in Columbus, Ohio, when this anæsthetic was given for major operations in a series of about 1200 administrations, thus furnishing a death-rate of about 1 per cent. The deaths occurred in the practice of various operators. Some of the deaths occurred in the hands of three administrators who are considered thoroughly competent specialists, and the one who has had the greatest number of deaths is regarded as the most skilful administrator of nitrous oxide and oxygen in the State. Three occurred in Dr. Baldwin's practice. The following may be taken as typical. A woman, aged 37 years, had a simple abdominal hysterectomy performed. In spite of Dr. Baldwin's protests and those of her medical attendant, she insisted on taking nitrous oxide and oxygen. She took the anæsthetic well, but just at the completion of the operation, without the slightest warning, the heart suddenly stopped. Cardiac massage was performed through the open abdomen and other methods of resuscitation were tried without effect. Dr. Baldwin also refers to a number of deaths known to other writers: 26 to Teter, of Cleveland; 18 to Miller, of Providence, R.I.; and 13 to Rovsing—many of which have not been reported. Writers on nitrous oxide and oxygen anæsthesia say that death is due to asphyxia, but in not one of the cases detailed by Dr. Baldwin was this so. In all death occurred without warning in the midst of an apparently smooth anæsthesia with the startling suddenness of an overdose of chloroform. Connell, in his article on Anæsthesia in Johnson's new work on "Operative Therapeusis," says that "since the extensive introduction of nitrous oxide and oxygen anæsthesia into general surgery, the reported and unreported deaths have probably far exceeded those from ether." Dr. Baldwin concludes that nitrous oxide and oxygen anæsthesia has a field of usefulness to which it should be strictly limited. It can be used for very brief operations, such as tooth extraction. It is also probably the safest anæsthetic, as suggested by Ochsner, in cases of acute pulmonary congestion or acute nephritis. With these exceptions, the anæsthetic should be regarded, he holds, as the most dangerous one that can be used, even in the hands of the most experienced.

PETROL SUBSTITUTES.

WHILST the Lambeth board of guardians are complaining of their inability to make full use of their motor ambulance in consequence of the petrol restrictions, and, like practical men, are casting about for a substitute for the spirit, the Bournemouth magistrates have thought fit to fine a local char-a-banc proprietor the sum of £5 for using what is known as "white rose paraffin oil" to help to eke out his allotted supply of petrol. We are not surprised that notice of appeal has been given against this decision, and it is certainly not in the interests of this country that attempts to find a substitute for petrol should be stifled by quibbling as to the exact definition of the term "motor spirit." The embargo was placed on petrol by the Government—and quite rightly so, if it were a fact—because of our alleged insufficient quantity for the needs of our Army; but if all substitutes are now to be placed under a like restriction, then we must part company with the scientific worker who is giving his time and his brains to create an industry which will make us independent of the foreigner. Many medical men, whose supply of the legitimate spirit is inadequate to their needs, are forced back upon substitutes—not because they like them, for all of our present substitutes are giving more or less trouble, but because they cannot help themselves. Therefore the necessary research work to find a suitable substitute for petrol should not be obstructed by hair-splitting definitions.

THE POONA WATER-SUPPLY AND DYSENTERY.—The bacteriological inquiry regarding the water-supply of Poona, which has been in progress during the past two years, has come to an end. For some years past it had been noticed that regular epidemics of dysentery started in Poona with the setting in of the monsoon. Captain R. V. Morrison, I.M.S., was put on special duty to inquire into these outbreaks, and he traced the epidemic to the contamination of the water-supply which runs into Poona in an open canal from Lake Fife, 11 miles away. The Government of India accordingly undertook the expense of a special bacteriological inquiry. Captain Morrison was placed in charge, and he was given the assistance of Dr. E. Fox, from the Kasauli Institute. A special laboratory was built in the compound of the Poona waterworks, where elaborate tests of water, both from Lake Fife and the canal, were made and careful statistics kept. Dr. Fox spent 18 months at Lake Fife, which has a catchment area of over 30 miles, and the water from which was carefully analysed. It is held to have been established conclusively that the epidemics of dysentery in Poona were directly traceable to the inflow into the lake of fæcal matter from surrounding districts during the monsoon. The statistics of water analysis and results shown by the bacteria cultures and their treatment have led to the adoption of a simple arrangement for purifying the water. Bleaching powder is now used as a disinfectant, and by regulating the flow of the disinfectant the taste of chlorine gas generated is not pronounced so long as due care is exercised in mixing. The inquiry was to be extended to Ahmedabad this year as being the next important centre, but the war has led to the suspension of work. The Bombay Government is taking over the laboratory and plant with a view to continuing the present investigations.

WAR, PROSTITUTION, AND VENEREAL DISEASE: THE POSITION IN GERMANY.[1]

THE present war has revived the problems of prostitution and venereal disease in an acute form, and, thanks to recent advances in the diagnosis and treatment of venereal disease, the energetic measures adopted in certain of the belligerent countries have given far better results than could have been obtained a few decades ago. But venereal disease remains a greater drain on the fighting forces than any other infectious disease, and the problems associated with it are still far from being solved. Since the outbreak of the war numerous independent papers on this subject have appeared in the medical press of the Allies and the Central Powers, in addition to the findings of the Royal Commission on Venereal Disease, and the Transactions of the Deutsche Gesellschaft für Bekämpfung der Geschlechtskrankheiten (D.G.B.G.).

Casualties from Venereal Disease Greater than from Wounds.

The Germans naturally hark back to the war of 1870 to compare the incidence of venereal disease then and now. Then, as many as 33,538 men, or nearly the equivalent of an army corps, were admitted to military hospitals suffering from venereal disease. This represented 9 per cent. of the total morbidity of the German Army. According to v. Töpley,[1] this was a surprisingly low proportion, venereal disease in most wars constituting from 17 to 31 per cent. of all the medical casualties. This author, an Austrian army surgeon, has shown that in most armies in war time from 50 to 300 soldiers per 1000 contract venereal disease every year. It has also been estimated that the dead and wounded in 129 modern battles constituted 79·4 per 1000 of the total strength of the armies concerned. From these figures v. Töply argues that were an army to fight one battle every year its casualties from dead and wounded would barely be as heavy as from infection with venereal disease.

Has Venereal Disease among German Soldiers Increased since 1870?

Though complete figures are not yet available, there is already a mass of evidence to prove that venereal disease is still a veritable scourge in the armies of to-day in spite of earlier diagnosis, more effective treatment, stricter discipline, and the regulation of prostitution. In the Prussian Army venereal disease has shown a fairly steady decline for several decades, as shown by Schwiening's table, quoted by J. Strandberg.[2] The figures in the second column represent the morbidity from venereal disease per 1000 soldiers.

Year.	Number of cases.	Year.	Number of cases.
1867	53·9	1890–91	27·2
1872	45·1	1900–01	17·8
1873–74	38·4	1909–10	20·8
1880–81	39·2	1910–11	19·9

In 1903–04 the incidence of the three venereal diseases per 1000 in the Prussian Army was 12·4 for gonorrhœa, 4·5 for syphilis, and 2·3 for ulcus molle. Before the war the control of venereal disease in the German Army was so effective that it was less frequent among soldiers than male civilians of the same age. Also, the incidence of venereal disease was higher among recruits than among soldiers already in the ranks. On April 30th, 1900, there were 30,383 men out of 10,000,000 Prussian men under treatment for venereal disease; and according to Professor Touton[3] this was roughly the number of Germans treated, towards the end of March, 1915, for venereal disease in the military hospitals on the Western Front.

So far it has been shown that for several decades a considerable reduction of venereal disease has been effected in the Prussian Army. Has this reduction been maintained in the Prussian and other German armies since August, 1914? Undoubtedly it has not; on the contrary, there is every reason to believe that there has been an alarming increase, not so much in the actual fighting-lines as in the occupied hostile territory behind them. Blaschko[4] has estimated that the incidence of venereal disease is bound to rise to about 40 per 1000 in the German Army, and that in an army numbering 7,000,000 men 280 000 would annually contract venereal disease, which in 60,000 cases would be syphilis. Neisser[5] also admits an alarming increase of venereal disease during the war, and he further draws attention to the sad fact that the proportion of married men among the infected has shown a most disquieting rise. Thus, among 653 cases of gonorrhœa and syphilis treated at his hospital in Breslau since the outbreak of the war there were 339 unmarried and 141 married men suffering from gonorrhœa, and 88 unmarried and 85 married men suffering from syphilis. Wolff has estimated the proportion of married to unmarried patients in the German military hospitals at 1 to 3. Another, at first sight, curious fact is the relative frequency of venereal disease among German volunteers and "Landsturm," as compared with the regular troops. This difference is accounted for by the former being largely kept in reserve in garrison towns, while the latter are more frequently employed in the fighting line, where the opportunities for contracting venereal disease are much restricted.

The Causes of the Growth of Venereal Disease in War Time.

The axiom enunciated many years ago by v. Töply that the incidence of venereal disease rises steadily during a war, and is therefore directly proportional to its duration, is founded on many different factors. Recruits drawn from country districts, where neither prostitution nor venereal disease is known, find the temptations of a garrison town irresistible; the women, the money, and the time unoccupied by military duties all help to lower the rustic's moral sense. Destitution is another common cause, many a previously virtuous woman being driven by dire poverty to maintain life by prostitution. And in the case of both men and women separation from wife or husband, and the resulting loneliness and deprivation of an intercourse which has become second nature, lead to the establishment of extra-marital, promiscuous relations. War brings in its wake a code of morals so utterly at variance with the accepted standard of peace that many men successfully posing as models of probity at home run amuck when constrained only by a so-called military law. It is particularly in hostile, occupied territory that the licentiousness of the German soldier has been given free rein, to judge only by German sources of information; and Blaschko has collected reports from Belgium, Northern France, and Poland of disgusting orgies. In Poland the distress is so great that the bulk of the women still living there have been driven to prostitution as the only means of existence.[2] In the Balkans the conditions in this respect are little better. Terrible as the fate of these women is, it is safe to say that their sufferings would not have attracted the attention devoted to them by the German military authorities were it not for the ill-effects of this state of affairs on the health of the German Army. As an example of the mass infection occurring in Poland, the example given by Blaschko may be quoted. In a small village about 135 men of the "Landsturm" contracted gonorrhœa which was traced in every case to the same source, a girl aged 13.

The German Campaign against Venereal Disease.

Germany has found it necessary to take the gloves off in the fight against venereal disease and to disregard many of the niceties and qualms respected before the war. Well disciplined as the German nation undoubtedly is, the restrictive measures put into force by the higher command would have roused serious opposition were it not for the plea of urgent necessity. As it is, a discussion has already been started in the German medical press on the feasibility of continuing after the war measures which have been found so effective at present; and the opinion is held in many quarters that after the war Germany will not tolerate the moral dragooning submitted to now.

In June, 1915, v. Hindenburg issued his now notorious order which aimed at a drastic suppression of venereal disease. Briefly, this order threatened with imprisonment for from two months to one year any woman who cohabited with soldiers or civilians in spite of the knowledge that she was suffering from venereal disease. Prostitutes who failed to register as such with the police were also liable to a year's imprisonment, followed by banishment from the occupied district.

Preventive Measures in Berlin.

The war had not lasted long before the authorities in Berlin realised that energetic measures would be necessary for the restriction of prostitution in an aggravated form. The Chief of Police issued three orders in succession,

[1] Abstract of a Report to the National Council for Combating Venereal Disease on the Control of Venereal Disease in Germany during the War.

beginning with the warning that the already existing regulations in connexion with prostitution would be strictly enforced, and that all provocation to immorality would be suppressed. In his second order he forbade all registered prostitutes to attend public places of entertainment, and in his third order he gave 24 hours' notice to barmaids and the like to quit. Thus, in one day about 700 women lost their employment and had to seek work in other and less exposed occupations. Much was done to find employment for these and other women left dependent on themselves by mobilisation.

Much has also been done for the German soldier. In Brussels, for example, a special institution has been organised for the comfort and entertainment of the 4000 Germans of the railway service in which, as might be expected, the incidence of venereal disease is extraordinarily high. On the lines of communication and in many towns reading-rooms and entertainments have been provided as counter-attractions; and whenever it has been feasible billeting on private houses has been avoided. When on the march soldiers are not put up in towns or densely populated districts, and when it is impossible to avoid quarters in a town the soldiers' leave is restricted. An educational campaign among soldiers has been conducted with great thoroughness, but it has been found that a whole sheaf of printed warnings is incomparably less impressive than the demonstration, *in corpore vili*, of a severe case of venereal disease. The treatment of venereal disease by quacks has been practically stamped out by certain army commanders, and penalties attached to the concealment of venereal disease have been most conducive to early detection and treatment.

Control of Prostitution.

Judging by the recent utterances of such authorities as Neisser and Blaschko, the belief is prevalent in Germany that extensive extra-marital sexual intercourse is an inevitable evil; the moral regeneration of the nation is not practical politics, and every effort should be concentrated on rendering irregular relations as harmless to their patrons as possible. In other words, the dangers of venereal disease from prostitution must be reduced to a minimum, and this aim naturally raises the old arguments for and against brothels under medical supervision. Blaschko considers the benefits of medical supervision illusory, even when daily examinations are made, for when as many as 40 different men are received by the same woman in one day, medical guarantees of the woman's freedom from infection must inevitably often be misleading. Blaschko is, accordingly, in favour of the closing of brothels, at any rate during the war, as they are a powerful stimulus to immorality. Neisser, on the other hand, speaking at the annual meeting of the D.G.B.G. in October, 1915, argued from his experience during the war that a well-controlled brothel system was less dangerous than uncontrolled prostitution. Both he and Blaschko are in favour of placing infected women, at any rate infected women in hostile, occupied territory, in concentration camps till the end of the war. Blaschko would even go so far as to mete out this treatment to every woman against whom there was a second conviction for prostitution. Neisser, again, would have treatment with salvarsan and mercury enforced on every prostitute, whether she were suffering from syphilis or not.

Prophylaxis of Venereal Disease.

The decline of venereal disease in the German Navy during the last decades has been largely attributed to compulsory prophylactic measures. These were not compulsory in the army before the war, but in some commands they have subsequently been enforced, and the soldier who contracts venereal disease and is found to have omitted the ritual of prophylaxis is punished.

The æsthetic aspect of this system of prophylaxis seems to have been lost sight of under the stress of war, the suppression of venereal disease at whatever cost being the first thought of the military authorities. Even Germans who before the war were vehemently opposed to the system of prophylaxis and the moral degradation entailed, seem to have come round to the view that nothing short of this unsavoury measure can be expected to check the spread of venereal disease. Many of them now admit that individual prophylaxis is the most powerful weapon against venereal disease yet known; and, speaking at the annual meeting of the D.G.B.G. in 1915, Neisser frankly stated that were this society to dissociate itself from the teachings of individual prophylaxis, its bankruptcy would be inevitable. Though the law still penalises the sale of anticonceptional remedies in Germany, her leading military authorities not only countenance but recommend their employment as preventives of venereal disease. It has been calculated that the decline in the birth-rate due to anticonceptional remedies is to a certain extent compensated for by the relative immunity to venereal disease secured by these remedies. And the decline of the birth-rate traceable to venereal disease itself is far from negligible, for it has been estimated that gonorrhœa has reduced the annual number of births in Germany by 200,000 and syphilis by 70,000. Before the war some squeamishness was felt by the medical profession with regard to recommending condoms; as preventives of conception they were viewed with disfavour by the authorities. But this property of the condom has almost been lost sight of during the war, and Blaschko, Neisser, Hoffmann, Lesser, Finger, and others have joined in recommending it as the most reliable protection against venereal disease. Every facility is given the German soldier to provide himself with this and other devices, and printed leaflets describing their mode of application are distributed broadcast by the military authorities to the soldier. In some commands the soldiers are equipped with small outfits containing calomel or sublimate ointment and solutions of silver nitrate, and it is even reported[2] that these packets have become so popular as to be sent to soldiers as "Liebesgaben an den tapferen Feldgrauen." The preparation found by Hoffmann to be most suitable for military purposes against ulcus molle, syphilis, and balanitis, &c., is a 33 per cent. calomel ointment made up in the proportions, calomel 10, lanolin 8, and vaseline 12

Treatment of Venereal Disease at the Front and at Home.

The respective merits of treatment at the front or at home have been hotly debated by the advocates of each course. Buschke and others have been in favour of sending every case of venereal disease to military hospitals at home and keeping them there till cured. One great merit of this procedure are the greater facilities for diagnosis and skilled treatment by specialists with nothing else to do. At and near the front the rush of work and the lack of specialists often lead to neglect of venereal disease, all the more as the medical officers are not trained in this specialty and are already overworked by other and more pressing casualties. Neisser, on the other hand, has insisted that in most cases venereal disease may well be treated on ambulatory lines, and that even in the case of gonorrhœa the patient may continue his duties. A compromise between these two schools has been reached, but it would appear that the majority of the patients are not sent home. Doing so often meant a long and exhausting journey, during which they often developed serious complications and exacerbations. Had it become the rule for every patient to be sent home, the prospect of a long holiday far from the fighting line would even have been a powerful inducement for soldiers to contract venereal disease. The very number of cases also made this course practically impossible; and during the first months of the occupation of Brussels it was found, according to Lenzmann, that this wholesale dismissal of patients to Germany was seriously depleting the garrison. Another argument against sending these patients home from afar is the high percentage of slight cases requiring little or no treatment. It was often found that patients had been sent home suffering from condylomata, molluscum contagiosum, non-gonorrhœal urethritis, pityriasis rosea, herpes genitalis, &c.—conditions that might well have been treated at the front, without the loss of time entailed by the long journey home. When these patients reached the military hospitals at home they were bundled back forthwith to the front without ceremony. It is very evident from the German reports that the subjects of venereal disease at the front are not coddled and pampered. Working at high pressure and in danger of his life, the military surgeon has no time, inclination, or instruments for irrigating the urethra or giving injections of mercury and salvarsan. Added to this, the strenuous life of the front not infrequently provokes such complications as epididymitis, prostatitis, arthritis, &c., so however beneficial it may be for the discipline of the army that these patients are not sent home, the welfare of the individual is frequently neglected. The Germans admit that the war has revealed widespread

ignorance of venereal disease in the medical profession, and they realise the necessity for providing more educational facilities for this specialty in the future.

Treatment of Venereal Disease in War Time.

In the case of gonorrhœa, the Germans appear to have carried out the treatment usually prescribed in times of peace, but in the case of ulcus molle many patients have been vigorously treated with mercury and salvarsan as well as with other drugs. This course has been taken on Neisser's advice. It is, in his opinion, easy even for the specialist in venereal diseases to overlook early syphilis when it is combined with ulcus molle; and, masquerading as a soft sore, a chancre may not be diagnosed till four to six weeks after infection. Hence the wisdom of an energetic abortive course of mercury and salvarsan, particularly in war time, when it is more important than ever to start treatment early. This procedure has not, however, been endorsed by all Neisser's colleagues, who regard this wholesale "drawing a bow at a venture" as too promiscuous and unscientific. The soldier who has thus been treated is left in doubt as to whether he has contracted syphilis or not, and he is not in a position to clear himself of the stigma of syphilis when marriage or life insurance is subsequently contemplated. But when primary or secondary syphilis has been definitely diagnosed, it is the practically universal opinion of German military syphilologists that mercury and salvarsan should be pushed, and that a combined course, lasting from four to six weeks, should be given. After such a course the chances of the disease being still contagious are for a long time exceedingly small, and the patient, being symptom-free, can be retained at the front. In the tertiary stage the most effective treatment has been found to be a combination of mercury, salvarsan, and potassium iodide.

Dangers of Discharging Soldiers with Venereal Disease.

A problem which has already been freely ventilated in Germany is that of the soldier who, at the end of the war, is suffering from venereal disease, but has qualified for his discharge. Is he to be a perfectly free agent, and to be allowed to return home and infect his wife? And if venereal disease is to be made a disqualification for immediate discharge, what steps are to be taken to sift the healthy from the infected soldiers? Neisser, Kraepelin, and many other authorities have urged that however great the cost and the technical difficulties may be, every officer, non-commissioned officer, and private should be subjected to the Wassermann test at the end of the war. A systematic hunt for the gonococcus in the urethra of every German soldier has also been advocated. Blaschko's proposals are less sweeping, and he suggests that Wassermann's reaction should for this purpose be confined at the end of the war to those soldiers who had shown signs of syphilis during the war. His programme includes the following measures: (1) Examination of every man who has suffered from venereal disease during the war, and a serological examination in every case of syphilis; (2) retention under military control of every case of active and infectious venereal disease until a cure has been effected; (3) transfer of all the other cases of venereal disease to the insurance societies ("Landesversicherungsanstalten") for observation and, if necessary, for treatment; and (4) drastic reforms in the control of prostitution. Other authorities have pleaded for the retention after the war of the restrictive measures and penal clauses, put into force by the military authorities and successfully carried through during the war. Among these measures are severe punishment for the transmission of venereal disease by persons conscious of their infectious condition, and severe penalties for quackery. With regard to Blaschko's third proposal, it should be added that steps have already been taken in Germany to enable the insurance societies to provide for those of their members who have contracted venereal disease. Though this movement is still in its infancy, and the dispensaries planned for the providing of advice and treatment required by the subjects of venereal disease have not yet been satisfactorily established, there is every prospect of a venereal disease service being organised on as systematic and national a basis as the German tuberculosis service.

A neutral who visited Berlin early in 1916 has described the activities of the "Reichsversicherungsamt" in this direction. The aim of the venereal disease department of this institution is to control every case of syphilis in the army. In most cases the patients are insured, but the official net is cast widely enough also to include the uninsured, so that all cases of syphilis may be notified to the central authorities. At the end of the war the dispensaries, insurance societies, and the central "Reichsversicherungsamt" will combine to supervise the syphilitic soldier, to secure the continuance of adequate treatment—preferably on the three-year, Fournier-Neisser system—and to keep him under observation with clinical examinations and serological tests for the rest of his life. A scheme has also been formulated for the supervision of the subjects of gonorrhœa, enabling them to be treated at little personal cost for a considerable time, and providing certain restrictions on the soldier's liberty and opportunities to convey the disease to the civilian population. These plans have been worked out in such detail that forms have already been printed for the use of patients wishing to transfer from one district to another.

All these vast schemes for the diagnosis, prevention, and treatment of venereal disease in Germany presuppose the existence of enormous sums available for social reforms after the war. They also presuppose a docility and a willingness on the part of the Germans to submit to far-reaching restrictions of personal liberty. These characteristics have undoubtedly been shown by the German nation before and during the war; but will they continue to the same extent afterwards?

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CANADA.

(FROM OUR OWN CORRESPONDENT.)

Saskatchewan Medical Association.

AT the recent annual meeting of the Saskatchewan Medical Association the discontinuance of these meetings during the war was held to have been a mistake, a view also taken by the Canadian Medical Association. It was due, as was pointed out by the President, Dr. G. P. Bawden (Moose Jaw), to the initiation of the Regina Medical Society that the meetings had been renewed. He also thought it had been a great mistake to do away with the office of general secretary, as the books of the association had got into a deplorable condition and there was no one to continue the work of the association and keep in touch with the various committees. Considerable criticism had been levelled at the provincial laboratory, as it seemed to be continued more in the interests of the farmer and his battle against disease in cattle than for the good of the health of the people of the province. Dr. Myers brought up the question of the attention to be paid to the returned disabled soldier. He considered Saskatchewan should not wait until the war was over before beginning to plan for these men. Up to July 13th, 1916, 236 disabled soldiers had returned to the province of Saskatchewan. The discussion on this paper showed that the medical profession of Saskatchewan were of one accord in their desire to assist the Government and the Canadian Hospitals Commission in their efforts to help these men. Another serious question introduced for discussion was that of adequate medical attendance and nursing care for the inhabitants of the outlying districts of the province. It was decided that a special committee should be appointed to go into this matter very carefully, to meet with representatives of lay bodies, and to report at the next meeting of the association.

Toronto Dental Clinic.

That a close connexion exists between general health and the condition of the mouth and teeth seems now to be generally better understood. Some kind of dental inspection is made in the schools of the larger cities in Canada, but Toronto seems to have been the first place in Canada to establish a dental clinic. This was brought about through the combined efforts of the Oral Hygienic Committee of Toronto Dentists and the Ontario Dental Society. It resulted in the appointment of one dental surgeon for the Toronto schools four years ago. To-day there are 15 centres

with a dentist in charge of each. As a result of their work the number of dental defectives found amongst 49,081 school children examined has fallen from 95 to 65 per cent. The school children are taught the importance of keeping their mouths clean, marks are given for clean mouths, and the interest of the children is awakened by the exhibition of slides and plaster-casts to show the malformation of teeth and jaws caused by neglect.

Military Hospitals Commission of Canada.

Convalescent hospitals under the Military Hospitals Commission have been established in various districts of Canada, and Provincial Commissions have also been organised to coöperate with the Dominion Commission. A special orthopædic centre has been established in Toronto, and all requiring artificial limbs are sent there direct from the port of disembarkation. It is proposed to establish a workshop for the manufacture of artificial limbs shortly, and as far as possible the services of returned men will be used in the manufacture of these limbs. So far, fortunately, very few Canadian soldiers have become blind, only four such having returned to Canada up to June 16th last. Dr. A. Thompson, Member of Parliament for the Yukon, has been appointed medical superintendent of the Commission, and Dr. F. J. Shepherd (Montreal) has been added to the personnel of the Commission. Arrangements have been completed to give instruction in business courses, penmanship, bookkeeping, &c., at the various convalescent homes, and vocational officers have been appointed in each province.

Ontario Medical Council.

At its annual session this year the Ontario Medical Council passed a resolution approving the appointment of graduates of recognised American (U.S.) colleges of medicine to medical commissions in the American legion or other units on the same footing as Canadian graduates. This matter was also brought to the attention of the Canadian Minister of Militia, and it has been announced from that department that equal facilities would be granted by the Department of Militia to United States graduates for service with the American legion or similar units, providing such graduates were fully qualified and of good standing. Dr. Edmund E. King (Toronto) was elected President of the Council.

Toronto, August 30th.

A MONTHLY RECORD OF ATMOSPHERIC POLLUTION.

THE returns in some instances have not been forthcoming, a number of stations having discontinued making observations owing to the reduction of staff. It is hoped that the omissions due to this cause will be made good when normal times return. The personnel of public health authorities concerned in the supervision of these examinations and of the analytical work involved remains the same as published in previous tables.

COMMITTEE FOR THE INVESTIGATION OF ATMOSPHERIC POLLUTION:

Summary of Reports for the Months ending April and May, 1916.

Place.	Rainfall in millimetres.	Metric tons of deposit per square kilometre during month.								
		Insoluble matter.			Soluble matter.		Total solids.	Included in soluble matter.		
		Tar.	Carbonaceous other than tar.	Ash.	Loss on ignition.	Ash.		Sulphate as (SO_3).	Chlorine (Cl).	Ammonia (NH_3).
Month ending April 30th, 1916.										
ENGLAND—										
Exeter	19	0·02	1·37	4·29	1·10	2·40	9·18	0·95	0·33	0·01
Leicester	26	0·11	4·71	0·73	1·48	2·69	9·72	0·76	0·59	0·17
London—										
Meteorological Office	34	0·10	1·86	4·57	Nil.	4·85	11·38	1·21	0·61	Nil.
Embankment Gardens	31	0·31	4·62	9·55	2·89	5·30	22·67	2·10	0·69	0·14
Finsbury Park	34	0·08	1·05	5·43	1·11	2·14	9·81	1·13	0·26	0·05
Ravenscourt Park	31	0·21	2·45	6·17	1·53	4·23	14·58	1·70	0·10	0·04
Southwark Park	34	0·05	2·16	6·07	2·39	3·73	14·39	2·32	0·14	0·04
Wandsworth Common	23	0·03	0·51	2·25	0·49	1·78	5·05	0·79	0·21	0·02
Victoria Park	31	0·03	1·21	5·41	1·99	4·28	12·92	5·47	0·37	0·05
Golden Lane	32	0·04	2·17	3·36	1·03	2·44	9·03	1·39	0·41	0·13
Malvern	28	0·01	0·09	0·24	0·31	0·90	1·54	0·42	0 09	0·02
Manchester—										
Queen's Park	72	—	—	—	—	—	14·10	—	—	—
School of Technology	67	—	—	—	—	—	22·10	—	—	—
Newcastle-on-Tyne	32	0·21	1·81	7·28	1·28	3·64	14·22	1·56	0·21	0·06
York	23	0·05	0·98	2·92	1·59	2·15	7·69	0·96	0·43	0·04
SCOTLAND—										
Coatbridge	87	0·15	1·46	2·89	1·51	4.84	10·65	2·19	0·92	0·16
Greenock	110	0·20	2·48	4·68	2·41	4·42	14·18	2·26	0·55	0·20
Leith	49	0·06	1·12	2·71	1·57	2·96	8·41	1·33	0·12	0 10
Month ending May 31st, 1916.										
ENGLAND—										
Exeter	41	0·01	1·49	2·99	0·78	2·79	8·06	1·06	0·30	0·04
Leicester	48	0·13	3·52	4·80	2·59	3·22	14·26	1·66	0·40	0·16
London—										
Meteorological Office	40	0·05	1·65	4·96	0·80	4·80	12·26	1·48	0·70	0·04
Embankment Gardens	31	0·35	4·44	5·76	1·65	4·08	16·28	1·82	0·49	0·08
Finsbury Park	60	0 36	3·23	16·13	1·17	4·67	25·56	1·82	0·44	0 05
Ravenscourt Park	47	0·13	1·30	3·40	1·26	4·59	10·68	1·83	0·42	0·09
Southwark Park	39	0·05	3·36	8·44	1·06	3·58	16·49	1·61	0·42	0·07
Wandsworth Common	39	—	0·76	2·45	1·24	2·54	6·99	1·02	0·36	0·04
Victoria Park	39	0·04	1·22	4·87	2·10	4·77	13·00	2·40	0·45	0·11
Golden Lane	47	0·07	2·26	3·27	1·88	3·75	11·25	2·14	0·57	0·22
Malvern	41	0·01	0·21	0·30	0·32	1·03	1·87	0·47	0·11	0·02
Manchester—										
Queen's Park	66	—	—	—	—	—	12·30	—	—	—
School of Technology	80	—	—	—	—	—	16·10	—	—	—
Newcastle-on-Tyne	75	0·16	5·34	10·09	2·68	4·91	23·20	3·00	0·50	0·11
York	57	0·14	1·17	2·93	1·26	3·65	9·15	1·41	0·44	0·06
SCOTLAND—										
Coatbridge	107	0·07	1·42	2·50	1·41	5·59	10·99	1·99	0·30	0·16
Greenock	118	0·25	2·88	6·73	2·62	5·65	18·12	2·90	0·26	0·25
Leith	79	0·05	0·94	1·21	3·15	5·36	10·71	2·43	0·46	0·03

"Tar" includes all matter insoluble in water but soluble in CS_2. "Carbonaceous" includes all combustible matter insoluble in water and in CS_2. "Insoluble ash" includes all earthy matter, fuel, ash, &c. One metric ton per sq. kilometre is equivalent to: (*a*) Approx. 9lb. per acre; (*b*) 2·56 English tons per sq. mile; (*c*) one gramme per sq. metre; (*d*) 1/1000 millimetre of rainfall.

VITAL STATISTICS.

HEALTH OF ENGLISH TOWNS.

IN the 96 English and Welsh towns with populations exceeding 50,000 persons at the last Census, 7343 births and 3976 deaths were registered during the week ended Saturday, Sept. 16th. The annual rate of mortality in these towns, which had increased from 10·5 to 11·9 per 1000 in the four preceding weeks, further rose in the week under notice to 12·0 per 1000 of their aggregate civil population, estimated at 17,312,295 persons for the year 1915. During the first 11 weeks of the current quarter the mean annual death-rate averaged 11·1, against a corresponding rate of 10·8 per 1000 in London. Among the several towns the death-rate last week ranged from 3·6 in Stockton-on-Tees, 4·1 in Dudley, 4·6 in Gillingham, 4·8 in Merthyr Tydfil, and 5·4 in Edmonton, to 18·0 in Liverpool, 18·2 in Preston, 18·9 in Birkenhead, 19·8 in West Bromwich, and 22·4 in Aberdare.

The 3976 deaths from all causes were 40 in excess of the number in the previous week, and included 594 which were referred to the principal epidemic diseases, against numbers steadily increasing from 212 to 580 in the eight preceding weeks. Of these 594 deaths, 477 resulted from infantile diarrhœal diseases, 35 from diphtheria, 33 from whooping-cough, 29 from measles, 11 from scarlet fever, and 9 from enteric fever, but not one from small-pox. The annual death-rate from these diseases was equal to 1·8, against 1·7 per 1000 in the previous week. The deaths of infants (under 2 years) from diarrhœa and enteritis, which had increased from 46 to 457 in the eight preceding weeks, further rose to 477, and included 97 in London, 70 in Liverpool, 29 in Birmingham, 27 in Manchester, 19 in Hull, 18 each in Birkenhead and Leeds, and 16 in Sheffield. The deaths referred to diphtheria, which had been 21, 27, and 47 in the three preceding weeks, fell to 35, of which 4 occurred in London and 3 each in Portsmouth and St. Helens. The fatal cases of whooping-cough, which had been 28, 24, and 28 in the three preceding weeks, rose to 33, and included 8 in London and 5 in Liverpool. The deaths attributed to measles, which had been 44, 50, and 37 in the three preceding weeks, further declined to 29; 11 deaths were registered in London, 4 in Manchester, and 3 in West Ham. The deaths referred to scarlet fever, which had been 12, 15, and 4 in the three preceding weeks, rose to 11, and included 2 in Liverpool. The fatal cases of enteric fever, which had been 5, 7, and 7 in the three preceding weeks, rose to 9, of which 3 belonged to London.

The number of scarlet fever patients under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, which had steadily declined from 1221 to 990 in the seven preceding weeks, further fell to 980 on Saturday last; 130 new cases were admitted during the week, against 111, 145, and 142 in the three preceding weeks. These hospitals also contained on Saturday last 1262 cases of diphtheria, 116 of measles, 81 of whooping-cough, and 42 of enteric fever, but not one of small-pox. The 984 deaths from all causes in London were 71 in excess of the number in the previous week, and corresponded to an annual rate of 11·9 per 1000. The deaths referred to diseases of the respiratory system, which had been 75, 66, and 78 in the three preceding weeks, further rose to 90 in the week under notice.

Of the 3976 deaths from all causes in the 96 towns, 151 resulted from violence, 300 were the subject of coroners' inquests, and 1140 occurred in public institutions. The causes of 35, or 0·9 per cent., of the total deaths were not certified either by a registered medical practitioner or by a coroner after inquest. All the causes of death were duly certified in Leeds, Bristol, West Ham, Bradford, Hull, Newcastle-on-Tyne, and in 73 other smaller towns. Of the 35 uncertified causes, 11 were registered in Birmingham, 5 in Liverpool, and 2 each in Stoke-on-Trent, Bury, Manchester, and Preston.

HEALTH OF IRISH TOWNS.

In the registration area of Dublin 178 births and 132 deaths were registered during the week ended Saturday, Sept. 16th. The annual rate of mortality, which had been 14·4, 19·3, and 14·8 per 1000 in the three preceding weeks, rose to 17·3 in the week under notice, against 11·9 and 13·8 per 1000 in London and Glasgow respectively.

The 132 deaths from all causes included 45 of infants under 1 year, and 32 of persons aged 65 years and upwards. Thirty-one deaths (of infants under 2 years) were referred to diarrhœa and enteritis, and 1 to measles. The causes of 6 deaths were uncertified, and those of 5 others were the subject of coroners' inquests, while 59, or 46 per cent., of the total deaths occurred in public institutions.

During the same period 182 births and 95 deaths were registered in the city of Belfast. The deaths corresponded to an annual rate of 12·7, or 0·7 per 1000 less than in the previous week, and included 26 of infants under 1 year and 17 of persons aged 65 years and upwards. Twenty-one deaths (of infants under 2 years) were referred to diarrhœa and enteritis, and 1 each to measles and whooping-cough. The cause of 2 deaths was uncertified, and those of 3 others were the subject of coroners' inquests, while 24 deaths occurred in public institutions.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

Surgeon-General Alexander J. J. Johnston, Surgeon-General William Eames, and Fleet-Surgeon G. E. Macleod are placed on the Retired List.

ROYAL ARMY MEDICAL CORPS.

Temporary Major B. W. Housman, having ceased to be employed with the 2nd Birmingham War Hospital, relinquishes his commission.

R. C. Tweedy to be temporary Major whilst employed at the 2nd Birmingham War Hospital.

Captain H. V. Leigh, from Welsh Regiment, T.F., to be temporary Captain.

Temporary Captains relinquishing their commissions: H. A. Watermeyer, E. L. Reid, J. B. Young, T. M. Low, R. E. Walker, A. B. Bradford, E. D. Pullon, E. T. C. Milligan, W. E. Reid, A. L. Christie, and F. A. Anderson.

Temporary Captain V. van Langenberg relinquishes his commission on account of ill-health.

Temporary Lieutenants to be temporary Captains: A. H. Laird, H. G. Coulthard, F. A. J. R. Brooke, A. W. McArthur, T. M. J. Stewart, M. McK. McRae, G. M. Jackson, E. L. Taylor, C. Samut, A. C. Troup, J. F. Young, F. O. Stohr, L. E. Sutcliffe, M. J. T. Wallis, H. Wales, W. Forsyth, F. S. Eschwege, J. B. McFarland, C. R. Hoskyn, W. G. T. Storey, R. A. P. Hill, R. H. Wilson, G. F. P. Heathcote, J. A. Conway, W. Cullen, T. S. Brodie, P. J. Lane, J. R. A. D. Todhunter, J. Lindsay, J. Reid, W. V. Johnstone, T. A. Hawkesworth, J. C. Fergusson, J. W. W. Hewitt, W. Mason, D. C. Maclachlan, W. R. Nasmyth, W. J. D. Robertson, G. Wight, J. Young, R. W. Telford, M. G. Hannay, A. McC. Davidson, D. S. Cassidy, H. Harvey, G. P. Armstrong, D. St. C. Creighton, J. A. Wellwood, J. F. Sadleir, F. L. McKinnon, C. E. Tucker, F. S. Noble, R. D. Smedley, J. A. G. Sparrow, J. C. Davies, D. Malloch, G. D. MacKintosh, A. C. Laing, H. P. Cuthbert, D. H. Jones, W. F. Shanks, A. Ashmore, W. D. Bathgate, H. G. Jamison, G. A. Hodges, R. P. Graham, J. T. Kyle, E. U. MacWilliam, T. F. Weakliam, E. Huntley, G. Johnston, J. Porter, D. M. Gill, J. Dickie, H. V. FitzGerald, W. Gilmour, E. H. G. Duncan, D. McKail, R. A. Parsons, H. F. Wickens, A. Rennie, E. J. McSwiney, S. J. L. Lindeman, G. Munro, H. W. Gabe, J. P. Dee, J. Lyons, G. R. Spence, D. Ferguson, J. C. D. Simpson, W. Barkes, R. P. Weldon, R. Puttock, W. T. Wearing, J. MacArthur, H. St. J. Randell, G. A. Barss, T. Milling, E. S. Sowerby, W. E. H. Beard, M. T. Cassidy, G. T. Gifford, M. F. Bliss, T. H. James, A. H. Aldridge, and J. Kirk.

Temporary Lieutenants relinquishing their commissions: J. Rosenthal, J. Cook, W. C. Swenerton, G. W. Gower, M. H. Cane, C. W. Webb, W. P. Wippell, T. P. McQuaid, A. Gibson, J. J. Tate, J. C. P. Beatty, J. Davidson, A. M. Fisher, and B. C. W. Pasco (on account of ill-health).

Lieutenant R. L. Williams, from Welsh Regiment (T.F.), to be temporary Lieutenant.

To be Lieutenants: J. E. Kitchen and E. Lipman.

Lieutenant on probation: R. S. Woods is confirmed in his rank.

Canadian Army Medical Corps: To be temporary Captains: N. B. Taylor (late temporary Lieutenant, R.A.M.C.), D. W. Davis (late temporary Lieutenant, R.A.M.C.), H. E. H. Chipman, and M. S. Inglis. Lieutenants to be temporary Captains: A. Pare, J. H. A. Paquette, J. A. A. Watters, J. G. R. Stone, S. R. Johnston, and E. E. Cleaver.

SPECIAL RESERVE OF OFFICERS.

Royal Army Medical Corps.

Captain W. M. Browne relinquishes his commission on account of ill-health.

To be Lieutenants: J. A. Murray (Glasgow University Contingent, Officers Training Corps), W. E. Wilson (from University of London Officers Training Corps), and J. J. Landers.

TERRITORIAL FORCE.

Royal Army Medical Corps.

Home Counties Field Ambulance: Major (temporary Lieutenant-Colonel) J. Ward relinquishes his temporary rank on ceasing to command a Field Ambulance.

London Field Ambulance: Major A. W. French to be temporary Lieutenant-Colonel whilst commanding a Field Ambulance.

North Midland Field Ambulance: Captain W. Duncan, from Attached to Units other than Medical Units, to be Captain.

West Riding Field Ambulance: Major (temporary Lieutenant-Colonel) F. Whalley relinquishes his temporary rank on ceasing to command a Field Ambulance. Captain H. N. Goodle to be temporary Major whilst commanding a Field Ambulance.

Wessex Field Ambulance: Major E. B. Bird to be temporary Lieutenant-Colonel whilst commanding a Field Ambulance.

Eastern General Hospital: The undermentioned to be seconded for duty with a General Hospital: Major F. E. A. Webb, Captain W. L. Murphy, Captain D. Mallam, Captain C. H. Budd, Captain E. J. Y. Brash, Captain R. V. Slattery, Captain J. F. Gaskell, and Captain F. Roberts. Captain H. S. C. Starkey is seconded for duty with a Field Ambulance.

Northern General Hospital: Captain A. E. Barnes is seconded for duty with a General Hospital. Lieutenant E. R. Flint to be Captain.

Southern General Hospital: Captain G. P. Mills is seconded for duty with a General Hospital. Captain H. G. Pinker resigns his commission.

Scottish General Hospitals: Captain R. A. Fleming is seconded whilst holding a temporary commission in the Royal Army Medical Corps. The undermentioned officers to be seconded for duty with a General Hospital: Lieutenant-Colonel P. Mitchell, Lieutenant-Colonel A. G. Hay, Major H. Rutherfurd, Major C. H. Usher, Major H. Walker, Captain A. W. Harrington, Captain D. Watson, Captain J. Patrick, Captain J. D. Holmes, Captain J. Henderson, Captain A. Fraser, Captain J. R. Riddell, Captain W. J. Stuart, Captain W. Whitelaw, Captain H. E. Smith, Captain R. Richards, Captain C. M. Nicol, Captain H. J. A. Longmore, and Captain T. H. W. Alexander.

Highland Casualty Clearing Station: Lieutenant A. E. Campbell to be Captain.

South Midland Mounted Brigade Field Ambulance: Lieutenant C. P. C. Sargent to be Captain.

East Anglian Field Ambulance: Captain J. H. Owens, from a General Hospital, to be Captain. Lieutenant J. Anderson to be Captain. Lieutenant V. T. Ellwood and Lieutenant E. N. Hoffmeister, from a General Hospital, to be Lieutenants.

Lowland Field Ambulance: Captains, from a General Hospital, to be Captains: P. T. Catto, F. W. C. Brown, J. W. Simpson, I. G. Bisset, and D. W. Berry.

Welsh Field Ambulance: Captains, from a General Hospital, to be Captains: J. G. McKinlay, F. Chadwick, and R. T. Jones.

Wessex Casualty Clearing Station: Lieutenant W. S. Richardson to be Captain.

London General Hospital: Captain W. C. Bosanquet is seconded whilst holding a temporary commission in the R.A.M.C.

Western General Hospital: Captain J. P. Buckley is seconded for duty with a Field Ambulance.

South-Eastern Mounted Brigade Field Ambulance: Captain (temporary Major) Frank Loud, Sussex R.G.A., to be Major (temporary).

South-Western Mounted Brigade Field Ambulance: Captain H. A. B. Whitelocke, from a General Hospital, to be Captain.

Northumbrian Field Ambulance: Captain C. D. Rogers is seconded for duty with a General Hospital.

Supernumerary for service with the Officers Training Corps.—Temporary Lieutenant V. G. L. Fielden to be temporary Captain whilst serving with the Medical Unit of Belfast University Contingent, Senior Division, Officers Training Corps.

Attached to Units other than Medical Units: Lieutenant F. J. P. Saunders to be Captain.

TERRITORIAL FORCE RESERVE.

Royal Army Medical Corps.

Lieutenant-Colonel W. J. Fleetwood, from West Lancashire Field Ambulance, to be Lieutenant-Colonel.

DEATHS IN THE SERVICES.

Lieutenant-Colonel William Selby, D.S.O., I.M.S., principal of King George's Medical College, Lucknow, honorary surgeon to the Viceroy of India, on Sept. 8th, at Lucknow, in his forty-eighth year. He received his first commission in 1894, and was promoted to the rank of Major in 1906, and reached the rank of Lieutenant-Colonel in 1914. He served with the Chitral Relief Force in 1895 (medal and clasp). In 1897-98 he served in the operations on the Samana and the relief of Gulistan (two clasps), and in the Tirah Campaign (one clasp). He was mentioned in despatches and was awarded the D.S.O.

Obituary.

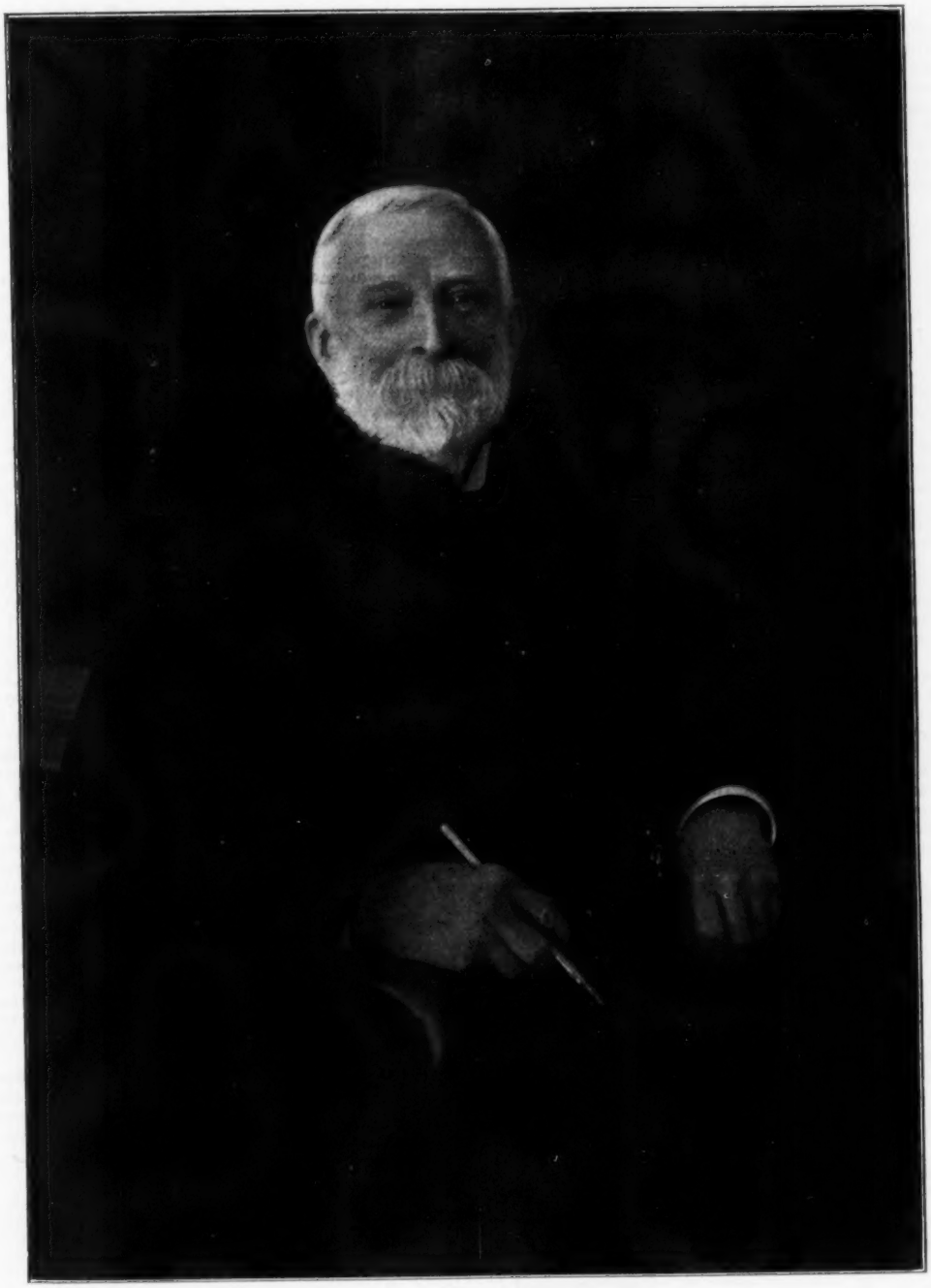
SIR T. LAUDER BRUNTON, BART., M.D., C.M., D.SC. EDIN., M.D. R.U.I. (HON.), LL.D. EDIN. AND ABERD. (HON.), F.R.C.P. LOND., F.R.S.,

CONSULTING PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL.

WE deeply regret to announce the death of Sir Lauder Brunton, which occurred at De Walden Court, London, on Saturday last, Sept. 16th. He was for many years perhaps the London consulting physician who was most widely known to the public, while his scientific attainments placed him in the position of a leader among his medical colleagues for over a quarter of a century.

Thomas Lauder Brunton was born in 1844 at Hiltons Hill, Roxburgh, and received his medical training at the University of Edinburgh, working also for a long time under various professors in Vienna, Berlin, Leipsic, and Amsterdam. At the University of Edinburgh he had a successful academic career, graduating in 1866 as M.B., C.M., with honours, receiving also the gold medal for his thesis. In the following year he became B.Sc., in 1868 he obtained the Edinburgh M.D., and two years later the D.Sc. After holding various junior appointments, as well as largely extending the range of his scientific equipment by varied work in continental clinics, he established himself in London, having become a Member of the Royal College of Physicians of London, and was appointed assistant physician to St. Bartholomew's Hospital in 1875. One year later he was made a Fellow of the College, while he had already, and at the early age of 30, been elected F.R.S. in recognition of admirable work, both theoretical and practical, on the physiology of digestion and secretion, on the chemical composition of the blood, and on the action of digitalis and mercury.

The range of his scientific and clinical work rapidly became very large, but it is interesting to note that in all his original investigations in physics, chemistry, and pharmacy alike the impetus of his work could be traced to his first studies—his interest in the problems of digestion, secretion, and cardiac action remained the starting point of all the valuable addition to our knowledge which he has given us. His first post at St. Bartholomew's Hospital carried with it, as was the case in those days in all medical schools, the lectureship on materia medica and therapeutics, but Brunton did not treat this post in the usual perfunctory manner. He immediately instituted many experimental investigations on the action of medicines on himself and on animals, as well as in the chemical laboratory, and embodied in published works his views on therapeutics approached from the pharmacological standpoint, writing both some valuable tables on materia medica and a text-book on physical chemistry. In 1885 he wrote his well-known handbook of "Pharmacology, Materia Medica, and Therapeutics," of which many editions have appeared both in London and America, while a French edition was published in Brussels immediately, and translations also appeared in Italian, Spanish, and German. The work established his position at once as a leader of scientific thought, for it appeared at exactly the right moment, when it was felt that pharmacology should no longer be considered a synonym of materia medica, but rather as a science dealing with the modifications produced in healthy conditions by the operation of substances capable of producing those modifications—i.e., as a branch of physiology. Lauder Brunton's comprehensive book was the first to consider pharmacology as a scientific study of the physiological action of drugs. The teaching was clear, commencing with the simpler facts and leading step by step to the latest chemical developments, generalities were as far as possible eschewed in favour of clear and precise directions for prescribing, and the references to the literature of the subject were exhaustive. The work was seen at once to promise an important influence in improving the study of pharmacology, and so in the event it proved. In 1877 Brunton delivered the Goulstonian lectures before the Royal College of Physicians of London, taking as his subject Pharmacology and its Relation to Therapeutics, and showed the reasons why therapeutics had made slow progress in the past, while indicating the methods along which their study had begun to advance, the results so far obtained, and their



SIR T. LAUDER BRUNTON, BART., M.D., D.SC.EDIN., F.R.S.

[Reproduced from a photograph by Messrs. Elliott and Fry.

prospects in the future. The lectures, which appeared in THE LANCET in abstract,[1] were a more detailed discussion of questions which he had set himself to answer in his book. In 1839 he delivered the Croonian lectures of the Royal College of Physicians of London, choosing as his subject the Relationship between Chemical Structure and Physiological Action.[2] These lectures were later expanded and published as an "Introduction to Modern Therapeutics," illustrating the connexion between chemical structure and physiological action in the prevention, control, and cure of disease, and all this literary work was supplemented later by his lectures on the "Action of Medicines," which were published in 1897, and by further books on "Disorders of Assimilation" and on the "Therapeutics of the Circulation." The lectures on the "Action of Medicines" made a thoroughly fascinating book, and in particular the section on the treatment of cardiac disease possessed, and possesses, great practical value. The author here did not keep within the scope of his title, for he reviewed our knowledge of the effects of athletics and of training for athletics upon the heart, and discussed the mechanical treatment of chronic heart disease at a time when this treatment was in its infancy. Throughout the book numerous useful hints for treatment were interspersed with physiological and pharmacological lessons, so that practitioners of medicine and students alike received the instruction that they required.

At about the same time as this book was published Brunton delivered an address on the Relationship of Physiology, Pharmacology, Pathology, and Practical Medicine at the International Medical Congress at Moscow, in which he went over a good deal of the same ground to the delight of a distinguished international audience. And the book on the "Therapeutics of the Circulation" was in continuation of similar teaching. It dealt with the fundamental problems of the circulation in health and disease, and was an expansion of his writings on the action of medicines, as far as these dealt with the conditions of circulation. The principal part of the work was delivered as a course of lectures in the Physiological Laboratory in the University of London, and the descriptions which he gave of the actions and uses of digitalis and its congeners, of strychnine, caffeine, aconite, and the nitrites upon the heart and vascular system were as valuable as they were interesting. In 1894 he delivered the Harveian oration before the Royal College of Physicians of London, taking for his subject the Modern Development of Harvey's Work, and showing once again his deep interest in the problems of the circulation.

We do not attempt to set out an exact bibliography of Brunton's numerous writings; there are collections of papers on the problems of the circulation and on physical and military training in which he further developed numerous lines of teaching laid down in his text-books, and in many prefaces to the books of others, designed for the improvement of morals, of health, or of physique, he was always able to support the religious tone implied by sound physiology.

In 1889 the Nizam of Hyderabad wrote to THE LANCET through the surgeon at the Residency, the late Colonel Edward Lawrie, I.M.S., to ask the Editors to send out a representative to repeat the experiments upon the administration of chloroform which had been performed by a committee appointed by His Highness's Government. The Nizam's Government placed the choice of a scientific man to repeat the experiments and make any others that might suggest themselves in the hands of the Editors of THE LANCET, and enclosed a fee of £1000, together with an invitation from the Government to be their guest in Hyderabad. The Editors nominated Lauder Brunton, who accepted the commission in the rather delicate circumstances that the work of the Hyderabad Committee had already come to certain conclusions with regard to the action of chloroform which were at variance with the views expressed by Brunton in his pharmacological writings. The elaborate work done by the Hyderabad Chloroform Commissions, and by Brunton, led to no very definite conclusions, and indeed discovered difficulties where none were supposed previously to exist. The work appeared in the columns of THE LANCET in 1890, and was afterwards reproduced in volume form through the help of Dr. Dudley Buxton.

[1] THE LANCET, March 17th, 1877, p. 377.
[2] THE LANCET, June 15th (p. 1181), 29th (p. 1289), July 13th (p. 57), and August 3rd, 1889 (p. 203).

Brunton had now become one of the best known consulting physicians in the country. In 1897, after having been no less than 22 years assistant physician to St. Bartholomew's Hospital, he became full physician, but seven years later he retired from the active staff, being elected consulting physician in 1904. He was a most faithful and energetic servant of the charity, and gave time without stint to the care of the patients and the instruction of the students, but neither as diagnostician nor clinician did his work at the hospital reach the high level of success indicated by his private practice. He was not really quite at home with hospital patients, and a certain very kindly ignorance of the practical side of life would sometimes lead him to miss indications which medical men with not a tithe of his scientific equipment would have recognised as of practical importance. He was apt to be led away in hospital practice by some one symptom or sign, and although his range of learning enabled him to make brilliant diagnoses, it also exposed him to the risk of attempting too much in this way. This same ingenuity was often of high value in the realm of therapeutics, especially where different troublesome symptoms required individual treatment. Here he was indeed resourceful. As a lecturer he met with complete and well-deserved success, both at his medical school and on more public or official occasions. It will be observed that his best books were the outcome of collected lectures, and those that are not so, where they are not merely popular disquisitions, conformed to the lecture style. He was always able to make his subject interesting and easy to follow, and yet he was very thorough, while he would illustrate his points whether simple or complex by example, experiment, or anecdote. Punctuality with him was a watchword, and simultaneously with the hand of the clock pointing to the lecture hour the figure of Brunton appeared at the door of the theatre, and almost before he had arrived at the demonstration table he had completed a rapid summary of the previous lecture, so that his audience might be able to follow his thread.

In 1900 he was knighted, and nine years later was given a baronetcy, while the Universities of Edinburgh and Aberdeen and the Royal University of Ireland bestowed honorary degrees upon him. Outside his purely professional work the outstanding features of Brunton's life were his great generosity and his practical sympathy with pain. The congenial kindly manner which endeared him greatly to his patients was a true indication of his almost emotional feeling for the sufferings of others. No one more bounteous with his time, thought, or money, whether to individual friends or for the public good, ever adorned the medical profession. All schemes in favour of national health, of school hygiene, or of military training had in him a stalwart advocate, and in this last connexion his close familiarity with the continent and the German professional world long ago led him to believe, and to say, that war between England and Germany was inevitable, and that military training was a national need with us. It is interesting to note that in August, 1915, Sir Douglas Haig, in a letter to Brunton, used the phrase, "You and I have often talked about the certainty of this war, and have done (each of us) our best to prepare in our own spheres for it."

We have received from two old and intimate friends of Lauder Brunton the following appreciations of his character and descriptions of his aims. It is not often that a great man's personality, as revealed to those who know him, is so exactly borne out by his public performance.

Dr. Mitchell Bruce writes:—

Personally, Lauder Brunton was the most gentle, affectionate, and unselfish of men, an entirely lovable and faithful friend, kindly and generous almost to a fault. He was keen, bright, and full of humour, but in the depths of his spirit intensely earnest and serious. He was born of an aged father on the Scots side of the Border, and his childhood was nourished by the old man on the Bible and the tales of that romantic country. The scriptures he knew and could quote on occasion from Genesis to the Revelation. His efforts to harmonise the Bible and science will be remembered—in particular, his explanations of certain miracles on physical and physiological grounds. This was but one evidence of his peculiarly personal and original way and habit of regarding Nature. He accepted nothing as common-place. The smallest event, the simplest-looking everyday condition appeared to attract his attention, and he would interpret it in terms of physiology or other science and give a new interest to it. This circumstance accounts for the impression

which he occasionally left on colleagues in consultations when he had propounded a novel view of the case—that his diagnosis was based more on interpretation of symptoms as evidences of disordered physiology than on determination of structural change. This only by the way: for beneath the character of his clinical method there were the solid wisdom, clear judgment, and resource of the practised physician—confident, ready, hopeful, and cheerful. To the details of his physiological diagnosis he was in every instance prepared to adapt his equally exact and intimate knowledge of therapeutics.

It was the aim of Lauder Brunton's life to leave therapeutics, if possible, as a science instead of merely an art, as he found it. In his Goulstonian lectures at the Royal College of Physicians of London in 1877 he said: "Hitherto we have been obliged to trust to the substances we procure from plants for our most powerful agents: and, even if we were to know the constitution of the particular remedy we required, it might be impossible to procure it. But now one alkaloid has been made, another and another have rapidly followed it. We can change the constitution and action of these in the same way as we alter those derived from the vegetable kingdom. It is therefore highly probable that we shall be able to produce artificially the substances which will act on the body in any way we desire." In the same lecture he emphasised the action of enzymes in building up and breaking down tissues and the actions of drugs upon them. And in his Croonian lectures, delivered before the Royal College of Physicians in June, 1889, he gave examples of the way in which his prediction was being fulfilled, and indicated the lines on which the work was to be continued. His "Experimental Investigation of the Actions of Medicines," 1875, was the first systematic text-book on experimental pharmacology; and his "Pharmacology," &c., 1885, was the first complete treatise on the subject from the standpoint of physiology, not from that of drugs. He formulated completely for the first time, in his thesis on digitalis, in 1866, the action of this drug on the heart and vessels. He introduced in 1867 a new class of remedies—vaso-dilators—into medicine. In using nitrite of amyl as a remedy for angina pectoris he was the first to employ a remedy in disease because its physiological action was to act in an opposite manner to the pathological condition which he had discovered in the disease—angina pectoris—viz., rise in arterial pressure. Magendie did the same in regard to strychnine in paralysis, only he recommended it to combat a symptom; Brunton recommended it to combat a pathological condition. He was the first to use scientific opotherapy by administering raw meat in diabetes in order to supply a glycolytic ferment. In his work with A. Macfadyen he found that bacilli *excreted* an enzyme by which they attack and digest the soil in which they grow. In this observation he believed that they were anticipated by Salmon. They were, moreover, the first to discover that bacilli have the power of adapting the enzyme they secrete to the soil on which they grow. As at the opening of his clinical career he made an historical observation on the arterial pressure in angina pectoris and the action of the nitrites, so during the last years of his life his mind appeared to be burthened by the problem of high pressure and the therapeutic control of it. His intimate friends knew of the origin of this—almost an obsession—in a lasting personal sorrow.

While his name was first and most closely associated with the actions and uses of medicines, probably no physician of his generation had a more intimate acquaintance with non-medicinal methods of treatment—climates, spas, exercises, massage, and the rest; and diet and the use of alcohol in health and disease were subjects on which he published much and was much consulted. Brunton enjoyed a wide and distinguished personal acquaintance both at home and abroad. In England as a scientist and physician he was in close contact with men of learning and public influence, and his attractive personality confirmed acquaintance into friendship. He became one of them, and was recognised as an authority on many practical subjects of national importance—particularly physical culture and hygiene—as one who was expected and was ever ready to express his views on the platform or in the press. This he did from a strong sense of duty (and in the last years of his life from fear of Germany, the strength and resources of which he knew), never for self-advertisement. He used to say that anticipation of public functions made him miserable for weeks. Abroad, through his scientific reputation and his frequent visits to the continent, he formed an extensive connexion with distinguished professors and physicians in many countries; some of them, indeed, became close personal friends.

For years before his death he was aware that his heart was unsound. He may have been the best judge of his own condition in its possible developments and ultimate issue, but happily he underestimated his powers of recuperation, and he again and again recovered health and capacity for work by accepting cheering advice from friends far less competent than himself. And so time and again he took up different portions of work which he desired to complete, and with carefully directed assistance carried them through. From first to last he led a laborious life, sweetened by the delights of high culture intellectually, by increasing interest in every aspect of nature, by the love alike of friends and patients, and by the happiest of homes—and the brightest until it was darkened first by the illness and death of his wife, and finally by the fateful shadow of the Great War.

Sir David Ferrier writes:—

By Lauder Brunton's death scientific medicine has lost one of its most eminent exponents, and many both in the profession and out of it have lost a dear and valued friend. Among these I have the privilege of counting myself; for our friendship dates from our student days in Edinburgh, and continued unimpaired, without even a passing cloud, to the day of his death. I was one of the few that were permitted to see him in his fatal illness, and it was inexpressibly sad to see how he struggled with his cardiac dyspnœa to welcome his old friend and chum. He was a most lovable personality, and he made friends wherever he went, at home or abroad. During all the long years of our intimate friendship I never heard him utter an unkind or harsh word of anyone. He was generous to a fault, and never spared himself to help a friend or promote any scheme that might be of public benefit. His wonderful wealth of information was always at the service of those who sought his advice, and this was highly valued by such leaders of thought as Darwin and Burdon Sanderson. While yet a student he gave promise of his brilliant future, and his graduation thesis on digitalis, and his demonstration, while house physician at the Edinburgh Infirmary, of the mode of action of nitrite of amyl in angina pectoris, are a type of his life's work. He lived laborious days, and sacrificed comfort, self-indulgence, and pecuniary advantages when engaged on any research which took his fancy at the time. When experimenting on himself with digitalis he lived a life of penance for six months; and he told me that one of the greatest pleasures he ever experienced was when he felt at liberty to eat and drink without having to weigh and measure his ingesta and egesta. All throughout life self-sacrifice was his dominant principle when he thought the occasion demanded it. Not unfrequently he gave up his lucrative practice for months in order to accomplish some work he had undertaken. In person Brunton had no imposing presence. As a candid American interviewer once said of us: "F., like Brunton, is another insignificant-looking man." But Brunton, modest and retiring as he seemed, speedily impressed his audience when he began to speak; and he liked to illustrate his remarks by quaint similes and personal anecdotes. He was very happy in his married life, and his wife was a true helpmate to him. He was never the same after her death. The light of his life seemed to have gone out with her. For two or three years before his death he began to suffer from the symptoms of heart block, which necessitated his almost entirely giving up his practice.

These outspoken and intimate appreciations of Brunton complete the picture that we have attempted to draw of a man who was alike a brilliant scientist and a most lovable personality. In his private life Sir Lauder Brunton was blessed beyond the ordinary, as the many who have enjoyed his friendship and his abundant hospitality will remember. He married in 1879 Louisa, daughter of the late Archdeacon Stopford, and her death after 30 years of perfectly happy union was a grave shock to health already giving cause for anxiety. By her he had two sons and two daughters. The younger son, Lieutenant E. H. P. Brunton, R.A.M.C., was killed on Oct. 8th, 1915. The elder, Lieutenant J. S. L. Brunton, an officer in the Canadian Army, succeeds to the baronetcy.

JAMES KEOGH MURPHY, M.A., M.D., M.C. CANTAB., F.R.C.S. ENG.,

STAFF-SURGEON, R.N.V.R.; SURGEON TO THE MILLER GENERAL HOSPITAL, GREENWICH.

WE regret to announce the death of Mr. James Keogh Murphy, surgeon to the Miller General Hospital, Greenwich, which occurred on Sept. 13th, at Plymouth, at the early age of 47. What bade fair to be a highly successful career has thus been inopportunely closed.

James Keogh Murphy had a double legal descent, being the eldest son of the Right Hon. Mr. Justice Murphy, and the grandson of the Right Hon. Mr. Justice Keogh. He was educated at Charterhouse and Gonville and Caius College, Cambridge, where he obtained a first-class in the Natural Science Tripos. He was for a time demonstrator of anatomy at the University of Cambridge, and then completed his

medical curriculum at St. Bartholomew's Hospital, where he won many prizes and held the usual junior appointments. After a short interval in general practice he returned to St. Bartholomew's Hospital, obtained the Fellowship of the Royal College of Surgeons of England, and proposed to devote himself to the practice of pure surgery. He secured election to the staff of the Miller Hospital and to that of the Paddington Green Children's Hospital, and at the same time showed great ability and energy in literary production. He published papers in THE LANCET and the *British Medical Journal*, and edited, in conjunction with Mr. D'Arcy Power, a useful System of Syphilis. He was editor also of the "Practitioners' Encyclopædia of Medicine," and was appointed general medical editor to the Oxford University Press.

Some ten years ago Keogh Murphy joined the Royal Naval Volunteer Reserve of Officers as surgeon, and was promoted to staff-surgeon at the commencement of the war. After serving in the hospital ship *Soudan*, he joined the Royal Naval Hospital, Plymouth. Of his work on board the *Soudan* we have received the following record from one of his colleagues:—

We were shipmates in the hospital ship *Soudan* in the early part of the war, and, being the anæsthetist, I had ample opportunities of observing Murphy's work. The operating theatres were planned by him, and to ensure the success of his work he carried with him a complete set of his own instruments. As a diagnostician he was rarely at fault, and as an operator he was far above the average, not always orthodox, but careful and thoroughly safe. Murphy was always trying to improve his technique, and on board one constantly found him conferring with the ship's carpenter over some new appliance he had thought out. He was beloved by his patients, and never spared himself any trouble in seeing to their comfort at any hour.

Of his work after he joined the Royal Naval Hospital at Plymouth another colleague writes as follows:—

Keogh Murphy's sudden and unexpected death has deprived the staff of the Naval Hospital of a colleague who had endeared himself to all with whom he came in contact. Keogh Murphy was an excellent example of the good all-round type of medical officer, so essentially valuable in the Naval Service, and well illustrated the late John Wood's dictum that "A physician is a physician, but a surgeon is a physician and something more." His almost encyclopædic knowledge was always at the disposal of his colleagues. A skilful and at times a brilliant operator, he will be greatly missed in those departments of surgery which are, in civil hospitals, the exclusive domain of the specialist. But Murphy will be chiefly remembered for his loyalty to his colleagues, his lovable nature, and his immense capacity for making friends. His patients worshipped him; and the large attendance of officers, nurses, and patients at the funeral service in the hospital chapel on Saturday (16th) testified to the affection in which he was held by all.

THE LATE DR. WILLIAM ALEXANDER BUDD.—Dr. W. A. Budd, who died recently from cardiac valvular disease at Torquay, was a son of the late Dr. S. Budd and came of a family well known in medical circles in the West of England. He was in his sixty-eighth year, was formerly in practice at Exeter, when he was on the honorary medical staff of the Devon and Exeter Hospital and the Exeter Dental Hospital. More recently he had practised at Paignton.

THE LATE DR. A. W. SMYTH.—Dr. A. W. Smyth, who recently died at Ardcome, co. Tyrone, in his eighty-fourth year, came of a County Tyrone family, although he resided for long in the United States, and was superintendent of the United States Mint in New Orleans. This office carried with it the title of "Honourable," which, however, he never assumed. He was a man of wide information, who kept himself abreast of the times in current science, art, and music. In medicine Dr. Smyth will be remembered in connexion with the first successful case of cure in subclavian aneurysm by ligature of the innominate and vertebral arteries. This achievement was recorded by Erichsen in his "Science and Art of Surgery," and is also mentioned by more recent writers. Dr. Smyth also did pioneer work in regard to the function of the kidney. He showed that the glomerulus, instead of being a secreting body, was a vascular hydraulic ram, acting with great force and propelling the water along the tubules, and that the communication between the Malpighian corpuscle and the uriniferous tubules was different from that taught by Bowman. The view expressed by some of the late Dr. Smyth's friends that his scientific work did not receive the full recognition which was its merit is one with which many medical men concur.

The War.

THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue:—

Killed.

Captain W. Campbell, R.A.M.C., attached to the Royal Field Artillery.

Captain N. W. Broughton, R.A.M.C., attached to the Royal Field Artillery.

Lieutenant E. H. McVicker, R.A.M.C., attached to the Lancashire Fusiliers, came overseas with the Canadian Expeditionary Force as a member of the Canadian Army Medical Corps.

Died.

Staff-Surgeon J. Keogh Murphy, R.N.V.R., was educated at Cambridge and at St. Bartholomew's Hospital, London, and qualified in 1894. He proceeded to the F.R.C.S. Eng. in 1901, and at one time held the appointment of demonstrator of anatomy at his *alma mater*. He was a liberal contributor to medical literature.

Died of Wounds.

Captain A. W. Harvey, R.A.M.C., attached to the Royal Field Artillery, was educated at Cambridge and at St. Thomas's Hospital, London, and qualified in 1905. After holding appointments at the Queen's Hospital for Children, Hackney-road, London, and at the West Norfolk and Lynn Hospital, he practised at Westcliff-on-Sea, and joined the R.A.M.C. in March last year.

Previously reported Wounded, now reported Died of Wounds.

Captain H. E. O'Brien, R.A.M.C., attached to the Middlesex Regiment, qualified L.R.C.P.I. and L.R.C.S.I. in 1912, and was in practice at Heanor, Derbyshire, before joining the R.A.M.C. in the early part of last year.

Wounded.

Lieutenant A. G. Bisset, R.A.M.C., attached to the Royal Munster Fusiliers.

Captain H. B. Jeffs, Canadian A.M.C.

Captain B. E. Kelly, Canadian A.M.C.

Lieutenant J. E. Cheesman, R.A.M.C.

Captain A. C. Perry, R.A.M.C., attached to the Liverpool Regiment.

Captain G. F. Randall, R.A.M.C., attached to the Liverpool Regiment.

Captain J. A. Conway, R.A.M.C., attached to the Royal Dublin Fusiliers.

Lieutenant J. McPolin, R.A.M.C., attached to the Somerset Light Infantry.

Captain B. J. Mullin, R.A.M.C., attached to the King's Royal Rifle Corps.

Captain W. L. Whittemore, Canadian A.M.C., attached to the Canadian Infantry.

Captain E. F. W. Mackenzie, R.A.M.C., attached to the Gordon Highlanders.

Lieutenant L. R. Pickett, R.A.M.C., attached to the King's Royal Rifle Corps.

Major L. M. Purser, R.A.M.C.

Lieutenant H. E. Allanson, R.A.M.C., attached to the Royal Munster Fusiliers.

Lieutenant W. H. Broughton, R.A.M.C., attached to the Yorkshire Light Infantry.

Captain J. B. Cavenagh, R.A.M.C., attached to the Royal Dublin Fusiliers.

Captain J. M. A. Costello, R.A.M.C., attached to the Welsh Regiment.

Lieutenant-Colonel H. C. R. Hime, R.A.M.C.

Captain P. W. Ransom, R.A.M.C., attached to the Northumberland Fusiliers.

DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

Lieutenant T. Packman, Royal Horse Artillery, elder son of Dr. A. C. A. Packman, of Grove House, Rochester.

Lieutenant K. L. Hutchings, Liverpool Regiment, fourth son of Dr. E. J. Hutchings, of Southborough, Kent.

Second Lieutenant A. T. Chubb, Hampshire Regiment, only son of Dr. W. L. Chubb, of Farnborough, Hants.
Lieutenant E. W. Roper, M.C., Royal Fusiliers, second son of Mr. A. C. Roper, F.R.C.S., of Exeter.
Sergeant A. F. Palmer, A.S.C., fourth son of the late Dr. W. G. Palmer, of Thorpe Cottage, Loughborough.
Second Lieutenant F. A. Thew, London Regiment, only son of the late Dr. E. P. Thew, of Alnwick, Northumberland.
Lieutenant P. O. Limrick, King's Liverpool Regiment, only son of Dr. O. E. B. Limrick, of Liverpool.
Lieutenant A. W. Macdonald, Canadian Infantry, son of Dr. A. A. Macdonald, of Toronto, Canada.
Second Lieutenant E. P. Brown, second son of the late Dr. W. H. Brown, of North Shields.

THE BATTLE OF JUTLAND.

MENTIONED IN DESPATCHES.

In despatches dated July 15th and August 23rd, 1916, received from Admiral Sir John R. Jellicoe, G.C.B., G.C.V.O., Commander-in-Chief of the Grand Fleet, the names of the following medical officers are mentioned:—

Recommended for Honours.

Fleet-Surgeon Henry William Finlayson, R.N.
A zealous and hard-working officer, who organised his department in an efficient manner for the action.

Fleet-Surgeon Joseph Agnew Moon, R.N.
Was responsible for the excellent medical arrangements for dealing with the wounded in H.M.S. *Benbow*, which were very efficient.

Staff-Surgeon Bertram Raleigh Bickford, R.N.
For great gallantry and devotion to duty in action. This officer, though severely wounded by a shell splinter, persisted in attending to the wounded, only yielding to a direct order from myself [Commodore C. E. Le Mesurier] to place himself on the sick list.

Fleet-Surgeon Alexander Maclean, R.N.
Performed his exhausting duties with the greatest zeal and courage. The medical staff was seriously depleted by casualties; the wounded and dying had to be dressed under very difficult conditions on the mess deck, which was flooded with a foot of water from damaged fire mains. Fleet-Surgeon Maclean has suffered considerably since the action from his devotion to duty.

Surgeon-Probationer Douglas George Patrick Bell, R.N.V.R.
Devoted great attention to the wounded, and amputated a limb single-handed in the dark.

Staff-Surgeon James McAlister Holmes, R.N.
For the very efficient manner in which the wounded were attended to whilst under fire and subsequently.

Recommended for Early Promotion.

Fleet-Surgeon Robert Hill, C.V.O., R.N.
The principal medical officer of the Fleet Flagship and on my staff. His excellent organisation and services before and after the action were of great assistance, and contributed much to the well-being of the wounded.

Fleet-Surgeon Arthur Reginald Bankart, C.V.O., R.N.
Has organised his department for action in a most efficient manner.

Fleet-Surgeon Alexander Maclean, R.N.
(For services rendered see above.)

Fleet-Surgeon Ernest Alfred Penfold, R.N.
Was in the fore medical distributing station when a heavy shell burst just outside, killing and wounding many. Fleet-Surgeon Penfold was himself knocked down and bruised and shaken, but personally assisted in the removal of wounded, and afterwards tended the wounded with unremitting skill and devotion for 40 hours without rest. His example was invaluable in keeping up the morale of the wounded and of the medical party under very trying conditions.

Fleet-Surgeon Christopher Louis White Bunton, R.N.
Did good work, being hard pressed with many sudden casualties of a serious nature.

Staff-Surgeon Arthur Reginald Schofield, R.N.
For skilful and untiring attention to the wounded.

Temporary Surgeon Richard Stocker Carey, R.N.
For skilful and untiring atttention to the wounded.

Surgeon William James Aitken Quine, R.N.V.R.
For his assiduous care of and attention to the wounded, of whom he was in sole charge for over 40 hours, the staff-surgeon having been severely wounded.

Recommended for Commendation.

Fleet-Surgeon Harold Paget Jones, R.N.
Temporary Surgeon Horace Palmer Margetts, R.N.
Fleet-Surgeon John Hunter Pead, R.N.
Surgeon Horace Elliot Rose Stephens, R.N.
Fleet-Surgeon Arthur Richard Harrie Skey .R.N.
Fleet-Surgeon John Reid Muir, R.N
Surgeon-Probationer Neil Macleod, R.N.V.R.
Surgeon-Probationer Gilbert Blurton, R.N.V.R.
Surgeon-Probationer Carl Knight Cullen, R.N.V.R.

THE HONOURS LIST.

The following awards to medical officers engaged in the Battle of Jutland are announced:

C.B.

Deputy-Inspector-General of Hospitals and Fleets Robert Forbes Bowie.

D.S.O.

Fleet-Surgeon Joseph Agnew Moon, R.N.
Fleet-Surgeon Alexander Maclean, R.N.
Fleet-Surgeon Henry William Finlayson, R.N.
Staff-Surgeon Bertram Raleigh Bickford, R N.
Staff-Surgeon James McAlister Holmes, R.N.

D.S.C.

Surgeon-Probationer Douglas George Patrick Bell, R.N.V.R.

To be Deputy Surgeon-General.

Fleet-Surgeon Robert Hill, C.V.O., R.N.

Commended for their Services.

Fleet-Surgeon John Hunter Pead, R.N.
Fleet-Surgeon Harold Paget Jones, R.N.
Fleet-Surgeon Arthur Richard Harrie Skey, R.N.
Fleet-Surgeon John Reid Muir, R.N.
Surgeon Horace Elliot Rose Stephens, R.N.
Surgeon (temporary) Horace Palmer Margetts, R.N.
Surgeon-Probationer (temporary) Gilbert Blurton, R.N.V.R.
Surgeon-Probationer (temporary) Neil Macleod, R.N.V.R.
Surgeon-Probationer (temporary) Carl Knight Cullen, R.N.V.R.

Noted for Early Promotion.

Fleet-Surgeon Alexander Maclean, R.N.
Fleet-Surgeon Ernest Alfred Penfold, R.N.
Fleet-Surgeon Arthur Reginald Bankart, C.V.O., R.N.
Fleet-Surgeon Christopher Louis White Bunton, R.N.
Staff-Surgeon Arthur Reginald Schofield, R.N.
Temporary Surgeon Richard Stocker Carey, R.N., should he be transferred to the permanent list.
Surgeon William James Aitken Quine, R.N.V.R.

The President of the French Republic has bestowed the decoration of the Legion of Honour upon the medical officers mentioned:—

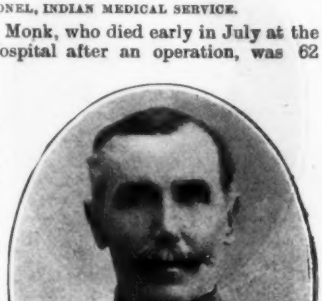
Croix de Chevalier.

Fleet-Surgeon Thomas Austen, R.N.
Fleet-Surgeon John Hunter Pead, R.N.

OBITUARY OF THE WAR.

CHARLES MONK, L.R.C.S. IREL.,
LIEUTENANT-COLONEL, INDIAN MEDICAL SERVICE.

Lieutenant-Colonel C. Monk, who died early in July at the 2nd London General Hospital after an operation, was 62 years of age, and had retired from the Indian Medical Service in 1908, after completing 30 years' full pension service. Amongst other appointments, he had been civil surgeon at Satara and port surgeon at Aden, as well as Principal Medical Officer of the Aden district. In 1914 he was appointed to the command of the 2nd London Casualty Clearing Station, R.A.M.C. (T.F.), and was mobilised with it on the outbreak of war. He went to France in March, 1915, and was twice invalided home, being finally appointed to the command of the 2nd London General Hospital. His death removes an officer of great experience.



GEORGE SEFTON MILLER, M.B., B.S. LOND., F.R.C.S. ENG.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain G. S. Miller, who was killed on active service in France on Sept. 8th at the age of 25 years, was son of Leonard Miller, vice-chairman of the Miller General Hospital for South-East London. He was educated at Colfe Grammar School, Lewisham, where he was head of the school and took the leaving scholarship, and studied medicine at Guy's Hospital, taking the Conjoint Board qualification in 1912 and the M.B. of London University in the following year. At the age of 23 he qualified for the F.R.C.S. Eng. After several house appointments at Guy's Hospital he joined the Royal Army Medical Corps early in 1915 and was at the front about 18 months. He met his death under the following circumstances. During a local attack and long before the enemy bombardment had abated he expressed his intention of taking two squads of stretcher-bearers up to the regimental aid posts to bring down any wounded men he could find. On his way back he was helping a bearer to lift a wounded man out of a trench when all three were killed instantly by a shell.

His fellow officers write of Captain Miller's courage in the face of danger—he applied to be transferred to a more exposed position—and his warm-heartedness as a friend. Just before his death he had ridden 10 miles to see if he could do anything for a fellow officer. If he had lived his surgical skill would have brought him to the fore.

HAROLD HERBERT TANNER, M.B., B.S. LOND.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain H. H. Tanner, who lost his life while bathing at Boulogne on August 16th, at the age of 29, was the only son of Herbert Tanner, F.R.C.S., of Westbourne-grove. Educated at Westminster School and St. Mary's Hospital, he took the M.B., B.S. degree of London University in 1910, and after holding resident appointments at St. Mary's Hospital, the Hampstead General Hospital, and the Albert Hospital, Devonport, he joined the staff of the Inoculation Department at St. Mary's Hospital in 1912. In May of last year he obtained a commission in the Royal Army Medical Corps, continuing, nevertheless, to be associated in work with Sir Almroth Wright, having charge of the ward attached to his research laboratory in Boulogne. During this time his neat and careful work contributed largely to the successful elaboration of the system of irrigation and drainage of wounds by means of bandage strips, which were demonstrated by Colonel Sir Almroth Wright at the Royal Society of Medicine in October, 1915.

Of Captain Tanner his chief writes: "He did such excellent good work and would have gone on doing really good things," adding that his kindliness and helpfulness endeared him to those associated with him. A short year before his death Captain Tanner married Minnie Bennett, daughter of the Rev. George Bowden of Kingston Hill.

GEORGE ROBERT HITCHIN, M.B., CH.B. VICT.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain G. R. Hitchin, who was killed in France on August 14th, was the only surviving son of Robert Hitchin, retired chemist, of Burnley. Educated at the Burnley Grammar School, Ellesmere College, Shropshire, and Owens College, Manchester, he graduated in medicine at the Victoria University in 1903, and then acted as surgeon on board steamships travelling between England, the far East, and South American ports. He next held various assistantships at Whalley (Lancs), Wetherby (Yorks), and Todmorden, and in 1909 he entered into partnership with Dr. A. H. Poole at Tottington, on whose retirement four years later he continued the practice on his own account.

In November, 1914, he obtained a commission in the Royal Army Medical Corps, attached to the East Lancs Field Ambulance, and after training with his corps at Southport, Forest Row, Crowborough, and Colchester, he left for France in July of this year. He was killed whilst tending the wounded in the first line of trenches.

Apart from his professional work, Captain Hitchin was a keen horseman, and was never so happy as when in the saddle. The news of his untimely death came as a shock to his patients and to a large circle of friends in the town and district where he practised.

WILLIAM WATT FARRAR, M.B., CH.B. GLASG.,

LIEUTENANT, ROYAL ARMY MEDICAL CORPS.

Lieutenant W. W. Farrar, who died on August 10th, in Bombay from cholera, at the age of 41 years, was the only son of the late Joseph Farrar, M.D., of Gainsborough, Lincs. He was educated at Glasgow and St. Andrews Universities, graduating M.B., Ch.B. Glasg. in 1901, and settled in general practice at Misterton, Notts, where he was medical officer of health, and held appointments as certifying factory surgeon, medical examiner under the Elementary School Teachers Act, and Poor-law medical officer. He was a familiar and welcome personality in the district, and his death leaves a gap which will be felt by many. Dr. Farrar was married and his widow survives him.

THE HARVARD HOSPITAL UNIT.—Owing mainly to the efforts of Sir William Osler and Mr. Robert Bacon, formerly U.S. Ambassador at Paris, the Medical Senate of Harvard University have been able to send to France a fully equipped base hospital unit consisting of 30 medical men, 2 dental surgeons, and 75 nurses. Yale, Columbia, Princeton, Johns Hopkins, and other universities have associated themselves in the provision of this unit, which will work under British hospital administration.

THE WAR RECORD OF THE LONDON MEDICAL SCHOOLS.

An inquiry into the war record of the larger metropolitan medical schools has resulted in the obtaining of some interesting figures. The questions asked were as follows: 1. During the first two years of war how many past or present students have joined the Navy and Army? 2. How many have died on service? 3. What honours have been gained? The figures we have received are as follows, the schools being given in alphabetical order:—

St. Bartholomew's.—Joined, 1475. Died, 39. Honours: V.C., 1; K.C.M.G., 1; K.C.V.O., 1; C.B., 8; C.M.G., 10; M.C., 16; D.S.O., 8; Legion of Honour (Croix de Chevalier), 1; Order of the Nile (Third Class), 2; Order of St. Sava (Fifth Class), 3; Volunteer Officer Decoration, 2; Promotion in the Field, 4.

St. George's.—Joined, 175. Died, 4. Honours: C.B., 1; C.M.G., 4; M.C., 3; D.S.O., 2; C.I.E., 1; Mentioned in Despatches, 17.

Guy's.—The list for this hospital is in course of compilation and the details will be published later.

King's College.—Joined, 100. Died, 6. Honours: K.C.M.G., 1; Knighthood, 1; C.B., 1; C.M.G., 2; M.C., 2; D.S.O., 4; Mentioned in Despatches, 2 or more.

London.—Joined, 800. Died, 31. Honours: V.C., 2; Knighthood, 1; C.B., 1; C.M.G., 5; M.C., 16; D.S.O., 7; D.S.C., 2; Order of Leopold (Chevalier), 1; Mentioned in Despatches, 50.

St. Mary's.—Joined, 384. Died, 19. Honours: C.B., 2; C.M.G., 4; M.C., 4; D.S.O., 6; Order of St. Sava, 1; Mentioned in Despatches, 55.

St. Thomas's.—Joined, 620. Died, 24. Honours: V.C., 1; K.C.M.G., 1; C.B., 1; C.M.G., 7; M.C., 9; D.S.O., 7; M.V.O., 1; Mentioned in Despatches, 56.

University College.—Joined, 615. Died, 13. Honours: V.C. (clasp), 1; K.C.M.G., 1; C.B., 5; C.M.G., 10; M.C., 11; D.S.O., 7; Legion of Honour (Croix de Commandeur), 1; Mentioned in Despatches, 59 (7 twice).

The following figures have also been sent to us, but with the statement that they are incomplete:—

Middlesex.—Joined, 275. Died, 13. Honours, 12 or more.

In many cases additional information has been sent which, for the sake of uniformity, we have not incorporated in the lists given above. St. George's and St. Thomas's have respectively a total of 250 and 748 men in the services, including those who joined before the beginning of the war. Of the London and St. Mary's men, 43 and 25 respectively have enlisted as combatants. These figures were not asked for, and consequently have not been supplied in a majority of cases. We are glad to note them, however.

With regard to the totals it should be borne in mind (1) on the one hand that they only include the London schools of medicine and not all of these, and that in some cases the numbers are admittedly incomplete; (2) there may be a certain amount of overlapping where a man has been claimed as an old student by two (or more) schools, but we do not think that this will more than balance the accidental omissions.

INTERNMENT CAMPS IN THE UNITED KINGDOM.

Every internment camp in the United Kingdom was visited during the period from March to July this year by officials of the United States Embassy, and their reports have been issued in a White Paper. The following are the names of the officers' camps: Dyffryn Aled, Abergele; Holyport, near Maidenhead; Bevois Mount, Southampton; Donington Hall, Derbyshire. The names of the other camps are: Leigh, Lancashire; Cornwallis-road, Holloway; Shrewsbury; Frongoch, near Bala, N. Wales; Handforth, Cheshire; Eastcote, Towcester, Northants; Jersey; Stobs, near Hawick, N.B.; Douglas (I.O.M.); Knockaloe, near Peel, I.O.M.; Alexandra Palace, London; Feltham, Middlesex; Lofthouse Park, Wakefield; Stratford, London; Ware, Herts; Shirley Rink, Southampton; Dorchester, Dorset; Dartford, Kent; Oldcastle, Co. Meath. The report is quite favourable as to the arrangements of all the camps save that at Knockaloe, where improvements have been recently made.

THE BRISTOL MEDICO-CHIRURGICAL JOURNAL.

The last issue of this journal (Vol. XXXIV. No. 130. July, 1916. Special Number), is the second special war number of the journal and it contains several articles of great interest at the present moment. Dr. W. Gordon opens with a description of the methods adopted at the Grand Palais for the Reduction of Disabilities from Wounds in War. Mr. E. W. Hey Groves writes on the work of a military general hospital in Egypt, and states that in regard to the septic conditions of seven days' standing with which he had to deal there was no recognisable difference in the results produced by (1) ordinary antiseptics, e.g., carbolic and perchloride; (2) peroxide of hydrogen; (3) salt solutions of various strengths; and (4) eusol. Dr. P. Watson-Williams contributes a note on the Technique of Sphenoidal Sinus Exploration; and Mr. J. P. I. Harty describes among other special work at a base hospital 13 cases in which the sphenoidal sinus was explored by the suction-syringe method with five positive results. Dr. J. Michell Clarke deals with the clinical aspect of Some Neuroses of the War, and the absence of cases of conscious simulation of nervous disorders. Notes on the enteric group are given by Dr. J. M. Fortescue-Brickdale from an isolation hospital in France. In 5 per cent. of the cases under his care bacteriological evidence was insufficient to identify the fever. A short paper on the Forensic Examination of Blood-stains in the Tropics, by Dr. F. Shingleton Smith, whose promising career was cut short in Mesopotamia, completes a series of representative war studies on which the editors may be congratulated.

THE SOUTH AFRICAN WAR HOSPITAL, RICHMOND.

—It has been decided to add 220 beds to this hospital, making a total of 520. Mr. Otto Beit has given £10,000 towards this extension, and the National Bank of South Africa has contributed the cost of one ward. The bank has also given £5000 to the South Africa Fund for War Relief.

Medical News.

CHELSEA HOSPITAL FOR WOMEN.—The Chelsea Hospital for Women has been receiving patients since August 2nd in the new building in Arthur-street, Chelsea, which was opened recently by the Queen. Until funds permit of the building of a new nurses' home 57 beds will, as at the present moment, be available for patients. Eventually there will be beds for 80 patients. The Freemasons' Nursing Home Committee have rented the old building and have handed it over to the War Office for the treatment of wounded during the war. But the committee have an option to purchase it ultimately for a nursing home and are appealing for funds to complete this scheme. Contributions may be sent to Mr. S. H. Goldsmid, honorary treasurer, or Mr. Herbert H. Jennings, secretary, at the hospital.

SOCIETY FOR THE STUDY OF INEBRIETY.—The next meeting of this society will be held in the rooms of the Medical Society of London, 11, Chandos-street, Cavendish-square, W., on Oct. 10th, at 4 P.M., when Dr. J. W. Ballantyne, F.R.S.E., will open a discussion on Alcohol and Ante-natal Child Welfare. The report of the society for 1915-16 just issued announces that the next Norman Kerr memorial lecture will be given by Major W. McAdam Eccles. Some interesting discussions are announced. On Jan. 9th, 1917, Sir John Kirk will draw attention to Alcoholism and Child Welfare in War Time, and in April Dr. R. Murray Leslie, chairman of the Women's Imperial Health Association, will discuss the Instruction of the Public in the Importance of the Prevention and Arrest of Alcoholism. The report records the warm appreciation of the council for the services rendered by the retiring President, Dr. Mary Scharlieb. Sir William J. Collins, K.C.V.O., has been appointed President for the ensuing year.

NEW MATERNITY ACCOMMODATION AT KING EDWARD VII. HOSPITAL, CARDIFF.—At a recent meeting of the board of management of this hospital Colonel Bruce Vaughan said that owing to the generosity of many donors it would be possible to provide 50 beds for a maternity hospital which would be ready for occupation in January, 1917. There will be accommodation for a training school staff and also for a resident medical officer. They would be able to receive at least 1000 women during the year and take charge of 1000 children, and there would be an out-patient department in connexion with the hospital. The income required would be between £4000 and £5000. To complete the work £25,000 was required for the buildings and at least an addition of between £14,000 and £15,000 to the annual income. The area of the site on which the new wards will stand provides accommodation for at least another 50 beds in the future.

Correspondence.

"Audi alteram partem."

THE TREATMENT OF SEPTIC WAR WOUNDS.

To the Editor of THE LANCET.

SIR,—You will hardly expect me to reply to Sir Almroth Wright's personal attack on me either by defending my own or dissecting his mentality. It is a great pity that he has made this such a personal matter; so long as it remained impersonal any criticisms of methods or views, however trenchant, could have been answered, and possibly in course of time the two lines of thought would have more nearly approximated one another.

I am, Sir, yours faithfully,

Sept. 18th, 1916. W. WATSON CHEYNE.

THE USE OF PICRIC ACID IN SURGERY

To the Editor of THE LANCET.

SIR,—In reference to the article of Major T. F. Brown, D.S.O., in THE LANCET of Sept. 2nd on the use of picric acid in surgery, a few notes may not be out of place from one who has consistently used it during a goldfields practice of the last 16 years.

The staining by picric acid which only really affects the cutaneous tissues is best removed by sodium bicarb., a hot fomentation of which will readily remove the discolouration of the skin which Major Brown mentions, but it will not remove it from hair or nails. Washing the hands in soda bicarb., besides removing the discomfort of having one's hands stained, gets rid of the equally unpleasant quinine-like flavour carried by picric-stained fingers to any food handled.

I found picric most efficacious dressing for all recent injuries, especially in head and hand. It was applied by soaking a small piece of cotton-wool in 1 per cent. saturated lotion and applying it freely to the cut surface or the wound, leaving a saturated piece on for cover; over this a piece of dry wool was placed, and a bandage applied until the whole dried, when the bandage and wool not adhering could be removed, a hard collodion-like dressing resulting, which took the daily friction without injury. In operating it was found very efficacious for all cutaneous incisions or when dry dressings were advisable. Wounds healed without the red sensitive line otherwise present. Its anæsthetic qualities relieves the patient of all cutaneous pain. For hand and foot abrasions I never found anything that could compare with it. All superficial foot injuries caused by walking were readily healed by painting with picric or applying cotton-wool soaked in it. Bad gravel rash resulting from bicycle accidents healed in a day or two, which ordinarily would have incapacitated for a week. The abrasions became dry and painless. A bottle of picric was to be found in most of the miners' camps, for its efficacy became well known. Scalp injuries, even when complicated with fractures, swabbed out with a saturated solution, and then dressed with picric, healed as I have never seen them heal by any other process. In this connexion it is as well to dress every second day at first, as there is an organism which is capable of growing under a picric dressing which disintegrates the superficial layer of skin without pain and makes the wound look bad for a couple of days. Hot boracic acid foment is rapidly fatal to it.

In regard to deeper suppurating wounds with hæmolytic organisms giving grumous pus, I found picric not to be compared in action with pure liniment of iodine or a washing with hot iodine solution sufficiently strong to stain the hands of the operator deeply. The reddy, brick-coloured discharge is always accompanied by tissue destruction. I found picric useless and iodine absolutely efficient, provided there was sufficient penetration to reach into all the pockets. From test-tube experiments on pus I should say that the limit of iodine liniment penetration is half an inch at most, so that if a half-an-inch pocket was left unswabbed the organism would continue its tissue-destruction course, but wherever the iodine reached the bottom of the sinus it was absolutely fatal to hæmolytic organism. This is demonstrated by the immediate absence of the brick colour in subsequent discharge. I do not think during the 20 years I have used super-iodine douches or the pure liniment I ever saw a failure where penetration was possible. The rule carried out in regular practice was that where it was desired to keep the wound or operation wet to facilitate discharge super-iodine was used, but where it was desirable to dry up nothing equalled picric. Picric and iodine should never be used together or they interact and blister. The disadvantages of picric were in certain cases where an intolerance occurred with acute itching of coloured parts after continued use due possibly to acid irritation of nerve endings. This was easily removed by soda bicarb. foment, the picric being discontinued. The only other disadvantage was the superficial skin destruction when dressings were left on too long. When picric dressing loses its colour and becomes white it shows a need for dressings being changed, but sometimes the wool coating is too hard for it to show through. Circumcisions dressed with picric dry have no raw period. Picric wool made by soaking wool with picric and allowing it to dry makes the best dry dressing I know, but the wool should be cut with scissors and not torn when needed, as the small particles of picric which then float in the air give an unpleasant taste if inhaled by mouth or nose.

I can cordially endorse Major Brown's plea for a more extensive trial of the many advantages of the use of picric as an immediate dressing for wounds.

I am, Sir, yours faithfully,

HENRY A. ELLIS,
Ex-Honorary Surgeon, Sydney and Coolgardie Hospitals

Middlesbrough, Sept. 11th, 1916.

PLAGUE IN ENGLAND.

To the Editor of THE LANCET.

SIR,—May I call attention to the annotation under this heading in your issue of Sept. 9th, where you state:—

So far as we are aware, the circumstances associated with the cases at Bristol and Hull are such as to suggest that the plague infection was probably ship-borne.

As a matter of fact, this suggestion—as regards Bristol—is quite untenable, as the Local Government Board bacteriologist stationed at Avonmouth reports that out of 291 rats, which have been examined to determine this point since the occurrence of plague cases in Bristol, all have been found to be absolutely free from any suspicion of plague infection. The port of Bristol is, therefore, not under any suspicion of plague whatever; a matter of considerable importance in regard to our home and foreign commercial relationships. No suspicion of plague in Bristol city, either among rat or man, has arisen since August 10th. Full reports of the whole circumstances will be issued at an early date.

I am, Sir, yours faithfully,

D. S. DAVIES, M.D., LL.D.,
Medical Officer of Health, City and Port of Bristol.

Sept. 15th, 1916.

ALCOHOL IN THE TROPICS.

To the Editor of THE LANCET.

SIR,—In a review of Woodruff's "Medical Ethnology" in THE LANCET of June 10th, 1916, p. 1172, your reviewer speaks of the author's "surprising conclusion that those who drink alcohol in the tropics enjoy better health than abstainers." I cannot see anything surprising in this. I should rather be surprised if the contrary were maintained. It is, as in other climates, a matter of *quale*, *quantum*, and *quando*. I should have thought that there was plenty of evidence in print of the wholesomeness of alcoholic beverages everywhere. To give a single instance of an active, hard-working man in tropical Africa, let me refer your reviewer to Sutherland's "Adventures of an Elephant Hunter," p. 169. I think that he will admit that there are, at any rate, exceptions to his own views. Nowadays, when there is so much bigoted antagonism to the use of alcoholic drinks, and it is often looked upon as a virtue to abstain, it is as well to take broader views and recognise the beneficence of their action, and to encourage the moderate and judicious use of them. What would the British nation have been without beer and wine, and what would it sink to if it

entirely gave them up? Would Germany be as formidable without her plentiful supply of beer and wine?

I am, Sir, yours faithfully,

Exeter, South Australia, Aug. 1st, 1916. F. LUCAS BENHAM.

PS.—May I take this opportunity of referring to a totally different point suggested by Mr. H. H. Moyle's article on "The Odour of Paint as a Cause of Plumbism" (THE LANCET, May 27th, 1916, p. 1083). He does not state whether old paint had been burnt off any of the doors or woodwork previously to repainting. This is, of course, often done, and it is, as I know by experience, quite capable of producing unpleasant symptoms of lead poisoning; the wind blowing the products of combustion into the house. This accords with your statement in an accompanying annotation that lead is only capable of volatilisation at a high temperature.

THE CHOICE OF ANÆSTHETIC FOR A MILITARY HOSPITAL.

To the Editor of THE LANCET.

SIR,—Referring to the interesting letter of Mr. A. de Winter Baker in THE LANCET of Sept. 16th on the above subject, I beg to be allowed to make two remarks in order to prevent misconception.

Firstly, I alone am responsible for the modification of the Hewitt's chloroform mouth-prop and tube (as illustrated) to which he is good enough to call attention; that is to say, the addition of grooves containing rubber for the teeth to rest upon, so arranged as to be easily renewable (either by cutting a suitable piece from thick sheet-rubber or by buying it ready cut from the Holborn Surgical Instrument Company, who now stock it). I explained this idea to Mr. Baker, and after I had discussed the exact details with our resident dentist Mr. Baker kindly had one made for each of us.

Secondly, Mr. Baker is "*senior*" resident anæsthetist here only in the sense that his appointment is dated about three months prior to mine.

We have always worked harmoniously together, and I am sure Mr. Baker will not object to my making the above points quite clear.—I am, Sir, yours faithfully,

H. L. NOEL-COX, M.D.,
Resident Anæsthetist, County of London War Hospital.

Epsom, Sept. 15th, 1916.

STATE ECONOMY AT THE EXPENSE OF MEDICAL MEN.

To the Editor of THE LANCET.

SIR,—I see by the Parliamentary Intelligence in THE LANCET of July 8th that some heat was generated in the debate *re* the proposed abolition of the system of reports on accidents in factories and workshops made by the certifying surgeons. I was glad to see that the thermal point was raised to an appreciable temperature. Now I am not, and never have been, a factory surgeon; I have, however, acted temporarily as such for a friend who was in a big dockyard town and know a little about the work. My friend for whom I acted is at present serving his country in France. As far as I remember, much work was done for very small pay, and the nature of the work was such as could only be done by a medical man. I see that the Government has paid £12,500 in one year as the total amount divisable among 2000 surgeons; this averages the princely sum of £6 10*s.* each, the price of the upkeep of one wheel of the doctor's motor for one year. Why should the Government economise at the doctors' expense? Do I hear aright that since the war the fee payable for a certificate under the Infectious Diseases Act has been reduced? Has the medical man's income gone up since the war? I think not. The price of drugs has risen enormously, petrol has gone up, but has the medical man raised his fees? I have not heard so. I had to abandon my practice the day war broke out, being an officer of the Royal Army Medical Corps (Territorial Force). I am not complaining about it at all, although I have lost three quarters of my income and possibly my practice. But is the Government going to set me on my legs when I get home again? Is it possible that Cabinet Ministers are going to put by half their salaries—two of such would amount to the total annual fees payable to factory surgeons—and unite with the Members of Parliament in establishing a fund for medical men out of their combined salaries? As regards the work of a factory surgeon, I do not think it is impossible for his brain to grasp the workings of mechanical appliances and machinery. It is as well at times to have an open mind and an unbiased opinion on these matters.

I am, Sir, yours faithfully,

MAJOR.

*** Many regret the action taken by the Government in respect of certifying factory surgeons, but in every department of life economies are being effected, some wise, some unwise, but all with the firm intention to husband the national resources in a time of immense trial.—ED. L.

THE NOTIFICATION OF PULMONARY TUBERCULOSIS IN BELFAST.

To the Editor of THE LANCET.

SIR,—I should like to call attention again[1] to a curious feature in the returns of the Registrar-General for Ireland, for which no explanation has yet been offered. In the July returns of infectious diseases in Dublin and Belfast, only one notification of "tuberculous phthisis" is credited to Belfast, but 73 to Dublin. If reference is made to THE LANCET of July 29th, 1916, p. 207, it will be seen that for the year ended March 31st, 1916, there were 1587 cases of pulmonary tuberculosis treated at the dispensaries founded by the city corporation, while in the sanatoria and hospitals provided by the same body 631 pulmonary cases were treated, and if to these be added those cases received into the union infirmary and the Forster Green Consumption Hospital, we get another 369; while under the head "treatment otherwise than in dispensaries and sanatoria (including domiciliary treatment)," there were, during the same 12 months, in Belfast actually 1410 cases of pulmonary tuberculosis. The discrepancy between the abundance of tuberculous cases in Belfast and the fewness of notifications requires some explanation, as well as the difference in the number of notifications in Belfast and Dublin.—I am, Sir, yours faithfully,

Sept. 14th, 1916. HIBERNICUS.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

BENNETT, F. J., M.R.C.S., L.D.S., has been appointed Clinical Assistant to the King George Hospital (Dental Department), Waterloo-road.

CORKER, J., M.B., B.Ch. R.U.I., Tuberculosis Officer at York.

STEPHENS, G. A., M.D. Lond., Certifying Surgeon under the Factory and Workshop Acts for the Swansea District of the county of Glamorgan.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).

When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BIRMINGHAM, CITY FEVER HOSPITAL, Little Bromwich.—Female Resident Medical Officer. Salary £250 per annum, with board.

BIRMINGHAM GENERAL DISPENSARY.—Resident Medical Officer, unmarried. Salary £250 per annum, with apartments, &c.

BIRMINGHAM AND MIDLAND EYE HOSPITAL, Church-street.—Resident Surgical Officer. Salary £300 per annum, with residence, &c.

BOLTON INFIRMARY AND DISPENSARY.—Female Second House Surgeon. Salary £200 per annum, with board, &c. Also Female Third House Surgeon. Salary £180 per annum, with board, &c.

BRIGHTON, ROYAL SUSSEX COUNTY HOSPITAL.—Junior House Surgeon, unmarried. Salary £80 per annum, with a war bonus at rate of £100 per annum, with board, &c.

BRISTOL ROYAL INFIRMARY.—House Physician. Salary at rate of £120 per annum, with board, &c.

CITY OF LONDON HOSPITAL FOR DISEASES OF THE CHEST, Victoria Park, E.—Resident Medical Officer. Salary at rate of £250 per annum. Also Assistant Resident Medical Officer. Salary at rate of £150 per annum, with board, &c.

DUDLEY, GUEST HOSPITAL.—Assistant House Surgeon. Salary £120 per annum, with board, &c.

DUNDEE, KING'S CROSS (FEVER) HOSPITAL.—Resident. Salary £150 per annum, with board, &c

EVELINA HOSPITAL FOR CHILDREN, Southwark, London, S.E.—House Physician. Salary at rate of £160 per annum, with board, &c. Also Clinical Assistants in Out-patient Departments.

GREAT YARMOUTH HOSPITAL.—House Surgeon, unmarried. Salary £200 per annum, with board, &c.

GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon.

HUDDERSFIELD ROYAL INFIRMARY.—Two Assistant House Surgeons. Salary per annum—qualified £150, unqualified £80, with board, &c.

LEEDS PUBLIC DISPENSARY.—Female Resident Medical Officer. Salary £200 per annum, with board, &c.

[1] See THE LANCET, March 25th, 1916.

LEICESTER CORPORATION.—Female Second Resident Medical Officer for Isolation Hospital and Sanatorium, Groby-road. Salary at rate of £250 per annum, with board, &c.

MONMOUTHSHIRE COUNTY COUNCIL.—Female Assistant Medical Officer. Salary £350 per annum.

NEWCASTLE, COUNTY WICKLOW, ROYAL NATIONAL HOSPITAL FOR CONSUMPTION FOR IRELAND.—Assistant Resident Medical Officer. Salary at rate of £200 per annum, with board, &c.

RAINHILL COUNTY ASYLUM, near Liverpool.—Temporary Assistant Medical Officer. Salary 7 guineas a week, with quarters, &c.

SHEFFIELD, JESSOP HOSPITAL FOR WOMEN.—Female Senior and Junior House Surgeons, unmarried, for Gynæcological and Maternity Departments. Salary £300 and £200 per annum respectively, with board, &c.

SHEFFIELD, ROYAL INFIRMARY.—Two House Surgeons. Salary £100 per annum, with board, &c.

SOUTH LONDON HOSPITAL FOR WOMEN.—Female Pathologist. Salary at rate of £250 per annum.

SUNDERLAND ROYAL INFIRMARY, CHILDREN'S HOSPITAL.—Resident Medical Officer for six months. Salary £150 per annum, with board, &c.

WARWICKSHIRE AND COVENTRY JOINT COMMITTEE FOR TUBERCULOSIS, BRAMCOTE SANATORIUM, near Nuneaton, Warwickshire.—Resident Medical Officer. Salary at rate of £250 per annum, with board, &c.

WEST BROMWICH AND DISTRICT HOSPITAL.—Assistant House Surgeon. Salary £120 per annum, with board, &c.

WEST HAM HOSPITAL, Stratford.—Resident House Surgeon. Salary £150 per annum, with board, &c.

THE Secretary of State for the Home Department gives notice that in consequence of the death of Sir Charles Ball, one of the Medical Referees under the Workmen's Compensation Act, 1906, for the County and City of Dublin, the appointment held by him is vacant. Applications for the post should be addressed to the Under Secretary, Dublin Castle, and should reach him not later than Oct. 13th, 1916.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Pollokshaws, Lanark; and at Kirkoswald, Cumberland.

Births, Marriages, and Deaths.

BIRTHS.

FORBES.—On Sept. 8th, at 15, Elgin-mansions, Elgin-avenue, W., to Captain W. S. Forbes, R.A.M.C. (T.), and Mrs. Forbes—a daughter.

JORDAN.—On August 17th, 1916, at 6, Maxted-park, Harrow, to Dr. and Mrs. Alfred C. Jordan (of 13, Upper Wimpole-street, W.)—a daughter (Beatrice Rose Christine).

KELLY.—On Sept. 17th, at Thornby Rectory, Northamptonshire, the wife of Captain Carlisle Kelly, M.C., R.A.M.C., of a daughter.

KENT.—On August 3rd, 1916, at Tongshan, North China, to Dr. and Mrs. Hugh Kent—a son.

MARRIAGES.

TODHUNTER—STENSON.—On Sept. 14th, Captain J. R. A. D. Todhunter, R.A.M.C., and Marjorie Ethel, daughter of the late J. H. Stenson, of Trichinopoli, and Mrs. O'Hara, of Boscombe.

WAGSTAFFE—CUTHBERTSON.—On Sept. 14th, at Holy Trinity Church, Boulogne-sur-Mer, William Warwick Wagstaffe, F.R.C.S., Captain, R.A.M.C., to Margaret Methven, daughter of the late James Cuthbertson, Broughty Ferry, Scotland.

DEATHS.

BRUNTON.—On Sept. 16th, at De Walden Court, New Cavendish-street, Sir Thomas Lauder Brunton, Bart., M.D., LL.D, F.R.S., in his 73rd year.

DAVIES.—On Sept. 12th, at Downs Park West, Durdham Down, Bristol, George Augustus Davies, M.R.C.S., L.R.C.P. Lond., aged 70 years.

HARLEY.—On Sept. 17th, at Saffron Walden, Essex, Edward Harley, L.R.C.P., M.R.C.S., aged 79 years.

MARSHALL-BARNES.—On Sept. 5th, killed in action, Alfred Hubert Marshall-Barnes, R.A.M.C.

ROBERTSON.—On Sept. 13th, at Abbotsleigh, Bridge of Allan, Surgeon-General Charles Robertson, M.D., I.C.S., aged 82 years.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

BOOKS, ETC., RECEIVED.

COLLINGRIDGE, W. H. L., London.
Simple Gardening. By L. B. Hyde, B.A. Cantab. Price 1s. net.
Fowls for Profit. By A. J. Macself. Price 2s. 6d. net.

MILFORD, HUMPHREY, London.
Preservatives and Other Chemicals in Foods. By Otto Folin, Ph.D. Price 2s. 6d. net.

NATIONAL UNIVERSITY OF IRELAND, Dublin.
Calendar for the Year 1916.

PEARSON, C. ARTHUR, London.
Cradles or Coffins? By James Marchant; with a Foreword, by the Lord Bishop of Birmingham. Price 1s. net.
The Hidden Scourge. By Mary Scharlieb, M.S., M.D. Price 1s. net.

ROUSSET, JULES, Paris.
Gangrène Gazeuse pendant la guerre de 1914-1916. By Professor Fr. Guermonprez. Second edition. Four vols.

SAUNDERS, W. B., COMPANY, London and Philadelphia.
The Kinetic Drive: Its Phenomena and Control. By George W. Crile, M.D. (Wesley M. Carpenter Lecture, 1915). Price 2s. 6d. net.
Collected Papers of the Mayo Clinic, Vol. VII., 1915. Price 28s. net.

STANFORD, EDWARD, London.
British Rainfall, 1915. By H. R. Mill and Carlo Slater. Fifty-fifth annual volume. Price 10s.

Notes, Short Comments, and Answers to Correspondents.

MEDIÆVAL INTESTINAL ANASTOMOSIS.

To the Editor of THE LANCET.

SIR,—Your interesting biographical notice of John Benjamin Murphy, whose brilliant surgery shed a lustre on the art, makes mention of his "button." The idea was his, and the popularising of it was his; and he was deservedly honoured for its introduction. Might I, however, say, without desiring in any way to detract from the honour due to Mr. Murphy, that the introduction of a foreign hollow substance into the bowel over which the cut ends of the intestine could be drawn is noticed and described by Lanfrank in his "Science of Cirurgie" in the seventh chapter of his second treatise. It is thus modernised. "Some say that the small intestine should be sewed in this manner: make a pipe of elder and put it within the intestine and sew the intestine upon it." As Lanfrank was a pupil of Salicetti, of Bologna, may we not credit this latter with the use of the pipe of elder? Thus we should find that its use in surgery dated as far back as 1250.

I am, Sir, yours faithfully,

Sept. 11th, 1916. GEORGE FOY.

DIPHTHERIA IN LONDON.

THERE have been several references during the past week in the newspapers to the number of diphtheria cases in London, and the total of cases for the week ending Sept. 16th—viz., 1262—has been mentioned as though it conveyed something unusual or calamitous. The following are the figures for the past 13 weeks from June 24th to Sept. 16th, week by week, for the purposes of comparison: 1280, 1313, 1303, 1274, 1266, 1288, 1253, 1269, 1238, 1245, 1239, 1265, 1262. The official heading to the summaries of six infectious diseases, of which diphtheria is one, is "Cases of Infectious Sickness in Hospitals at the end of each week," and the word "Hospitals" is qualified with the official remark, "The Metropolitan Asylums Board and London Fever Hospitals. The figures do not refer to London exclusively."

ETYMOLOGY OF THE TERM "BOCHE."

To the Editor of THE LANCET.

SIR,—This question was raised in an annotation in THE LANCET (Jan. 29th, 1916, p. 254) on the ethnology of the Aryans. On page 208 of Vol. I. of Charles Creighton's "History of Epidemics in Great Britain" (published in 1891), occurs the following passage:—

> The plague was called "the botch" down to the Elizabethan and Stuart periods; and the "botches" in Langland's poem, or, as he writes it, "boches," were the familiar risings, under the arms and elsewhere, which had given the disease its popular name when it began to recur time after time.

Many explanations have been offered of the somewhat obscure term applied to the Germans, but I do not remember having seen this, which seems to me as likely to be accurate as any. From the offence which the appellation causes the enemy it is evident that it implies something very unpleasant; and what, after all, could be more offensive than calling a man a "bubo"?

I am, Sir, yours faithfully,

H. KERR,
Medical Officer of Health, Newcastle-upon-Tyne.

Sept. 15th, 1916.

SUMMER TIME ACT, 1916.

IN accordance with the provisions of the Summer Time Act, 1916, popularly known as the Daylight Saving Bill, the time on all railways, at all post offices, and other Government establishments will on the night of Saturday-Sunday, Sept. 30th-Oct. 1st, at 3 A.M. "Summer Time" be put back one hour to 2 A.M. "Greenwich Mean Time." This will mean that a period of time from 2 A.M. to 3 A.M. "Summer Time" will be followed by a period of time from 2 A.M. to 3 A.M. "Greenwich Mean Time." It was on the night of Saturday-Sunday, May 20th-21st, at 2 A.M. that the clock was put forward one hour to 3 A.M.

TURKS AND CAICOS ISLANDS.

THESE islands, one of the smaller British dependencies, form geographically a sort of annexe of the Bahama group, and have a total area of about 170 square miles. They are under the same government as the colony of Jamaica and are administered by a commissioner, the latter office being now held by Mr. G. Whitfield Smith,

who, in his report for 1915, just presented to Parliament, estimates the population at 5930. The number of births during 1915 was 194, and of deaths 81. The birth-rate was 35 per 1000, and the death-rate 14 per 1000, the latter being the lowest recorded for many years. The health of the dependency during 1915 was good and there were no serious cases of disease or epidemics of any kind. The rainfall for the year was 35·38 inches, the highest temperature 93°, and the lowest 61·2° F.

GARDENING AND POULTRY-KEEPING.

THE difficulty of obtaining many articles of food at reasonable prices has induced a large number of people who hitherto have looked askance at outdoor domestic occupations to take up vegetable culture and poultry raising as profitable recreations. Such beginners in gardening and farming on a small scale will welcome two little books which have just been published by Messrs. W. H. and L. Collingridge, 148, Aldersgate-street, E.C. The first, *Simple Gardening* (price 1*s.*), written by Mr. Laurence H. Hyde, B.A., and edited by Mr. T. W. Sanders, the editor of *Amateur Gardening*, is a book for beginners, and gives in simple and lucid language exactly the appropriate elementary information. The illustrations are particularly helpful, and we doubt if there can be a better book for its purpose at so cheap a price. In order to help teachers who may wish to use the book in schools a series of questions on each chapter is given in an appendix. The other little treatise is *Fowls for Profit*, by A. J. Macself (price 2*s.* 6*d.* net), and deals with breeding, hatching, marketing, table birds, egg production, diseases, and pests—in fact, with the whole subject of poultry-farming. The book is well illustrated.

RELICS.

To the Editor of THE LANCET.

SIR,—I think it quite probable that "W. R.'s" relic is genuine. I have, or had, in my possession a similar one of less elaborate character. This was a solid block of oak, nearly black, cut into the shape of a book. It was given to my grandmother by a man who was engaged in Portsmouth Yard during the operations for removing the wreck of the *Royal George*, and I have always understood that he himself obtained the wood from the wreck. His tombstone still records the fact that he was a "Measurer in H.M. Dockyard," a rank which, I believe, has long passed into oblivion.

I am, Sir, yours faithfully,

Sept. 18th, 1916. R. L. W.

THE POPULATION OF THE POLISH COMMONWEALTH.

THE Polish Information Committee (110, St. Martin's-lane, London, W.C.), which is doing useful work in circulating trustworthy information about Poland and the interests of the Polish people, has sent us a well-informed study by Mr. Arthur E. Gurney, entitled "The Population of the Polish Commonwealth" (published for the Committee by George Allen and Unwin, Ltd., London. Price 6*d.* net). The Poles are the sixth nation in Europe as regards numbers, ranking next to the Italians. An interesting table is given showing the extent and population of Polish territories and the proportion of Polish inhabitants in them. The total number of Poles is given as approximately 24 millions, of whom 9 millions are in the Kingdom of Poland (Russian), 4½ millions in Galicia (Austrian), and 1½ millions each in Posen and Upper Silesia (German).

MACMILLAN AND ANOTHER *v.* NURSING PRESS, LIMITED, AND OTHERS.

WE are asked to point out that in our review of this pamphlet we did not make it clear that Miss Bulan, one of the plaintiffs, had been naturalised 25 years ago in New Zealand.

MILITARY BEARDS.

IT is reported that a French Army Order has been issued directing the men at the Front that they must shave off their beards. This order would affect Frenchmen more than most nations, as the Frenchman frequently carefully cultivates his first beard. But military necessity can take no cognisance of private feelings or trends of fashion.

Digitalis.—A hypodermic syringe can be rapidly sterilised by Wright's method. A small quantity of oil is raised to the temperature at which a bread-crumb, placed in the oil, becomes brown. This can readily be done in a spoon over a spirit lamp or candle. The hot oil is then drawn slowly up into the syringe and expelled.

COMMUNICATIONS not noticed in our present issue will receive attention in our next.

Medical Diary for the ensuing Week.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W,

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations. Dr. Simson: Diseases of Women.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY.—Clinics:—10.30 A.M., Surgical Out-patients (Mr. E. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham): Gynæcological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

TUESDAY.—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting).

WEDNESDAY.—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M., Eye Operations (Mr. R. P. Brooks).

THURSDAY.—2.30 P.M., Gynæcological Operations (Dr. A. E. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

FRIDAY.—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. E. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

THE THROAT HOSPITAL, Golden-square, W.

MONDAY.—5.15 P.M., Special Demonstration of Selected Cases.
THURSDAY.—5.15 P.M., Clinical Lecture.

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(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Sept. 20th, 1916.

Date.	Barometer reduced to Sea Level and 32° F	Direction of Wind	Rainfall.	Solar Radio in Vacuo.	Maximum Temp. Shade.	Min. Temp.	Wet Bulb	Dry Bulb.	Remarks.
Sept. 14	30·094	N.	...	104	58	49	45	51	Clear
,, 15	30·148	N.W.	...	109	62	43	45	47	Cloudy
,, 16	30·110	N.	...	105	64	47	54	56	Cloudy
,, 17	29·830	N.W.	...	99	63	50	51	54	Fine
,, 18	29·710	N.W.	0·26	109	62	54	54	56	Cloudy
,, 19	29·470	N.	0·06	101	57	43	48	49	Cloudy
,, 20	30·010	N.	0·16	71	56	49	50	52	Cloudy

The following journals, magazines, &c., have been received:—British Dental Journal, Military Surgeon, Journal of the Missouri State Medical Association, Ellingwood's Therapeutist, Archives de Médecine et de Pharmacie Militaires, Annales de l'Institut Pasteur, Modern Hospital, Medical Times (New York), Surgery, Gynæcology, and Obstetrics, Bulletin of the Office International D'Hygiène Publique, Maryland Medical Journal, American Journal of Orthopædic Surgery, British Journal of Dental Science, Symons's Meteorological Magazine.

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